BUREAU OF HYGIENE AND TROPICAL DISEASES.

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CHOLERA.

i. GRAHAM (J. D.). Le choléra dans la Présidence de Bombay en 1927. [**Cholera in the Bombay Presidency in 1927.**]—*Bull. Office Internat. d' Hyg. Publique.* 1928. Aug. Vol. 20. No. 8. pp. 1209–1211.

ii. ——. Sur le choléra au Bengale en 1927–1928. [**Cholera in Bengal, 1927–28.**]—*Ibid.* pp. 1212–1215.

i. During 1927 there was a serious epidemic of cholera in the Bombay Presidency, especially in the south and central districts. Between the 20th February and the 29th of October 50,024 cases were recorded with 21,319 deaths. A number of doctors and sanitary officers were sent out to deal with the outbreak and the usual measures for treatment and disinfection were carried out. Anti-cholera vaccination was largely employed and oral bile vaccine was also used.

ii. This is a brief report of the occurrence of cholera in Bengal during 1927–28 with tables which give the death rate and the distribution of cases in the various districts.

J. H. Tull Walsh.

ROGERS (Leonard). **The Incidence and Spread of Cholera in India; Forecasting and Control of Epidemics.**—*Indian Med. Res. Memoirs. Supplementary Series to Indian Jl. Med. Res.* 1928. Mar. No. 9. 175 pp. With 13 charts & 21 maps in text. [Summary appears also in *Bulletin of Hygiene.*]

The general history of cholera in India is traced from the beginning of the 19th Century, and from 1877 (when the necessary statistics are first available) to 1922 the monthly mortality data have been analysed in detail. These figures are examined in conjunction with several factors that may have a bearing upon the rise and fall in incidence, e.g. climatic conditions. The first section of the paper is devoted mainly to the proof of the author's thesis that the seasonal incidence of cholera is most closely related to the variations in the absolute humidity, and that cholera never becomes widely epidemic until the absolute humidity rises above 0·400. Why a combination of low temperature and great dryness should check cholera prevalence is still an unsolved problem. In the later sections of the paper the statistics are carefully examined for each division of the country. It is concluded

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that the most extensive and typically epidemic areas include the Punjab, the Northerly Sind and Gujerat divisions of Bombay Presidency, and the Central Provinces, while endemic areas include Bihar, the sub-Himalayan divisions of the United Provinces, Bengal, Assam and Orissa.

Deficient autumn rain due to early termination of the south-west monsoon, especially when followed by great diminution of the scanty winter rains, resulting, when extreme, in famine conditions, is the most important factor in predisposing to increased cholera incidence in practically all parts of India through producing scanty and impure water supplies. Note is made of the tendency for a year of great epidemic prevalence to be followed by unusually low cholera incidence due to reduced susceptibility of the remaining population. The second great factor, in addition to failure of the rains, is the enormous movement of millions of persons yearly in connexion with innumerable pilgrimages. The pilgrims both disseminate the disease broadcast within the endemic areas, and also frequently carry it from the endemic to the epidemic divisions and provinces. This movement is discussed very closely.

The conclusion is that the very close relationship shown in nearly every part of India between low autumn and winter rainfall, and the winter absolute humidity, and increased cholera, together with the influence of pilgrimages, to and from places in the endemic areas more especially, and the relation of cholera in one area to that in surrounding ones, should in future enable fairly reliable forecasts to be made of the probable incidence of cholera in any province. When the conditions are such that there is great danger of the spread of cholera, pilgrims should be inoculated before starting on their journey.

[The discussion of all these factors is so full that it cannot be adequately abstracted and should be read in the original.]

A. B. Hill.

KUANG (Yang Ting). [**Problems of Cholera in China and Japan.**]—*Jl. Oriental Med.* 1928. Sept. Vol. 9. No. 3. [In Japanese. English summary. pp. 29–34. 3 refs.]

The author considers the serious problems of cholera in China and Japan and makes many suggestions for dealing with them. Among them are (1) an intensive study of endemic areas in the Yangtze Valley ; (2) removal of causes—control of water works, sterilization of wells, etc. (a beginning has been made by the Shanghai Chinese Health Authorities) ; (3) mass vaccination and vaccination of each passenger leaving for Japan or Manchuria. As an Appendix the author gives the rules for dealing with cholera in ships, as formulated at the International Sanitary Convention, 1926.

J. H. T. W.

AUDIBERT. L'épidémie de choléra en Indochine en 1926–1927. [**Cholera in Indo-China.**]—*Bull. Office Internat. d' Hyg. Publique.* 1928. May. Vol. 20. No. 5. pp. 692–701.

The author describes the various outbreaks of cholera in the provinces of Indo-China. The mortality was not very great and vaccination was carefully carried out. During 1926, 2,172,784 inoculations

were performed among a population of about nineteen millions. The author considers that anti-cholera vaccination should be performed regularly twice a year under proper supervision.

J. H. T. W.

PEVERELLI (P.). De cholera-epidemie in 1927 te Batavia. [**The Batavia Cholera Epidemic of 1927.**]—*Nederl. Tijdschr. v. Geneesk.* 1928. Nov. 10. 72nd Year. 2nd Half. No. 45. pp. 5579–5584.

Since 1919 the Dutch East Indies had been free from cholera. The small epidemic in question was preceded by an outbreak on board a steamer coming from Singapore. Before the disease on this ship was recognized there had been contact of the ship with the shore. After a fortnight (3rd Nov.) another case occurred in the seaport Tandjong Priok. Adequate measures (disinfection, isolation of contacts and vaccination) were immediately taken. Yet after another 12 days another four fatal cases occurred in a densely populated Chinese quarter of Batavia. Thereafter, till 21st December, another four cases came under observation, all ending fatally. The obligatory *post mortem* inspection makes it practically impossible that any other fatal cases have escaped attention.

No connexion between the separate cases could be found, except in two cases probably due to food infection in a boarding house. The cases, remarkably, did not occur in the most unhygienic parts of the town, and the author ascribes the spread to carriers, a few of which were detected, especially among the prostitutes of the seaport, who no doubt had been in contact with the crew of the in ected steamer.

The epidemic quickly subsided after the usual measures, early detection of cases, isolation, disinfection, notification, quarantine and extensive vaccination; 235,611 people, or about 62 per cent. of the total population were vaccinated before the end of November.

W. J. Bais.

i. DE VOGEL (W.). Le choléra à Batavia (Indes Néerlandaises) en octobre 1927 et les mesures qui ont amené sa disparition. [**Cholera in Batavia.**] —*Bull. Office Internat. d'Hyg. Publique.* 1928. Aug. Vol. 20. No. 8. pp. 1232–1241. With 2 figs. & 2 maps.

ii. WINCKEL (Ch.). Instructions pratiques pour vacciner un grand nombre de personnes en peu de temps, afin d'immuniser la population contre une épidémie de choléra menaçante.—*Ibid.* pp. 1242–1245. With 1 fig.

i. An ordinary report of an outbreak of cholera—contains nothing new.
ii. Complete instructions for rapid vaccination with anti-cholera vaccine with proper sterilization of instruments, etc. The method does not differ from the practice in other countries.

J. H. T. W.

TULL (J. C.). **Cholera Carriers in the S.S. Hawaii Maru.**—*Malayan Med. Jl.* 1928. Sept. Vol. 3. No. 3 pp. 106–107.

The S.S. *Hawaii Maru* arrived in Singapore early in April. Passengers, mostly Japanese, were allowed to go on shore at Saigon, where

cholera was present. Twenty-four hours after leaving Singapore cholera broke out and the ship returned to Singapore. All cases and contacts were taken to St. John's Island and the entire ship's company were inoculated with anticholera vaccine. Twenty deaths occurred. After a fortnight no further cases occurred. The ship was fumigated. The South African and South American authorities refused admission to contacts unless a bacteriological examination was made. The task of examining the stools of all on board was undertaken by the ship's surgeon, Dr. ANDO and the author. The first made and labelled stained films which were sent to Dr. ANDO. 700 were examined and of these 80 showed suspicious vibrios. These 80 were sent to Dr. Tull for culture and agglutination tests. Fifteen of these contained *V. cholerae.* Of interest is the varying length of time such carriers, carefully inoculated, take to clear up, the time varying in this series from 32 to 6 days.

J. H. T. W.

TRENSZ (Fritz). Etude sur une diarrhée épidémique à vibrions observée au Gabon. [**Epidemic Diarrhoea due to Vibrios in Gabon.**]—117 pp. With 3 plates. [Dr. Schweitzer's Hosp., Lambaréné, French Congo & Inst. of Hyg. & Bact., Strassburg, Alsace.]

During 1926–1927 the author observed a peculiar form of epidemic diarrhoea due to vibrios apparently allied to *V. cholerae* [?] as to morphology but differing in clinical reactions. Clinically the disease is entirely confined to the intestines. The number of stools is from 3–6 daily passed without pain. These stools are abundant, creamy, yellowish-green in colour and without any marked odour. They contain a good deal of gas. The disease may become chronic with cachexia resembling sprue. There are no cramps and no vomiting, as in true cholera, and no anaemia. Out of 52 cases noted 5 died. The vibrio is motile and has two terminal flagella (see plates). In culture it resembles other vibrios. Cultures injected into rats and guineapigs proved fatal.

J. H. T. W.

D'HÉRELLE (F.). Le choléra asiatique. [**Asiatic Cholera.**]—*Presse Méd.* 1928. Aug. 1. Vol. 36. No. 61. pp. 961–964. With 2 charts in text. [2 refs.]

This paper describes work done for the Indian Government in 1927 with Major MALONE and Dr. LAHIRI. Its object was to examine for the presence and virulence of the cholera bacteriophage and to assess its value as a preventive or as a treatment. The material part of the paper has already appeared in the *Indian Medical Gazette,* 1927 [see this *Bulletin,* Vol. 25, p. 308 (D'HÉRELLE & MALONE)]. Vaccination and treatment by bacteriophage are to be tried on a large scale in India by Major MALONE. The author insists that both for treatment and for prophylaxis it is essential to use only cultures of bacteriophage of the greatest virulence for the microbe with which one is dealing. To use cultures of feeble virulence will only lead to failure.

J. H. T. W.

DHAR (D. R.) & SEN (K. C.). **On the Theoretical Basis of the Kaolin Treatment of Cholera and other Bacillary Infections of the Intestines.**—*Calcutta Med. Jl.* 1928. Aug. Vol. 23. No. 2. pp. 67–72. With 1 chart in text. [5 refs.]

The use of kaolin for the treatment of diarrhoea and cholera is generally well known. It is also used as a prophylactic by putting it into drinking water. It is a form of alumino-silicate and it is evident that there cannot be any appreciable change in the kaolin as it passes through the alimentary canal and it has no direct germicidal action. Some investigators consider its action to be mechanical but the author states that this cannot explain all the facts. It is to be assumed that the bacteria are kept attached to the surface of the kaolin and that the amount of adsorption is very high. The question whether living bacteria can multiply in presence of kaolin in a suitable culture medium will be dealt with in another paper. The present paper gives results of experiments with dead *V. cholerae*, colon and typhoid bacilli. Three tables are given showing the percentage of adsorption and it is observed that the cholera vibrios are adsorbed much more than colon or typhoid bacilli: 60 per cent. to 90 per cent.; 30 per cent. to 60 per cent. and 16 per cent. to 20 per cent.

J. H. T. W.

MATSUMOTO (Kaoru), ANDO (Keisaburo) & SHIRAIWA (Tatsujiro). Zur Frage der Durchlässigkeit der intakten Haut für Typhus-, Paratyphus- und Cholerabazillen. [**Passage of the Intact Skin by Typhoid, Paratyphoid and Cholera Bacilli.**]—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1927. Vol. 6. pp. 35–48. [16 refs.]

The experiments were carried out upon guineapigs with suspensions of the test organisms which were applied to shaved or unshaved skin over a surface of 2 cm. diameter. In some cases the skin was cleaned with alcohol before the application. Half an hour to five hours later the skin was disinfected with ether, iodine and alcohol and the animal set free from its constraint. The animals were killed 15 to 27 hours after and portions of the tissues or organs taken for culture of the organisms used. It was manifest that infection of internal organs had taken place but to a far greater extent and with greater frequency where the skin had been shaved than where it had not been shaved. Shaving produces minute open fresh wounds. Control experiments made with avirulent or with saprophytic organisms showed that these also could pass through the shaved skin to internal organs.

W. F. Harvey.

VAN RIEMSDIJK (M.) De invloed van de zuurstof op de bewegelijkheid der cholera-vibrionen. De "langdurige" hangende-druppel. [**Oxygen and the Motility of Cholera Vibrios. The Permanent Hanging-Drop.**]—*Nederl. Tijdschr. v. Hyg. Microbiol. en Serol.* 1928. Vol. 3. No. 1. pp. 1–21. With 2 text figs. [3 refs.] [M. van Riemsdijk Bact. & Serol. Lab., Amsterdam.]

If the vibrios from the pellicle of a bouillon culture of the cholera vibrios and from the fluid beneath the pellicle be examined in hanging drop over a period of twenty days certain remarkable phenomena are

observed. In the first place the vibrios from the pellicle show high motility as contrasted with those taken from beneath the pellicle, whose motility is low and scarcely to be distinguished from Brownian movement. The phenomena noted in this paper are especially to be seen in the more sensitive " under-pellicle " vibrios. Autoagglutination of the weakly moving organisms first takes place. In 3 or 4 days' time active motility is developed and the autoagglutination begins to diminish, but ultimately motility is again lost, autoagglutination sets in and there is production of involution forms. The causes of pellicle formation, autoagglutination and involution form production are severally considered from the standpoint of physical chemistry. High motility and low motility of vibrios is ascribed to the presence and absence of oxygen respectively.

W. F. Harvey.

Soru (Eugénie). Le signe de la charge électrique de vibrion cholérique normal, de l'agglutinine correspondante et du vibrion sensibilisé. [**The Electric Charge of Normal and Sensitized Cholera Vibrios and of their Agglutinins.**]—*C. R. Soc. Biol.* 1928. July 6. Vol. 99. No. 23. pp. 430–432. [7 refs.] [Lab. of Experim. Med. & Serolog. Inst., Bucharest.]

As a suspension fluid isotonic saccharose solution was used. The results obtained were :—

1. Normal cholera vibrios have a negative charge and they show no change of sign in solutions with pH between 1·9 and 10·5. The speed of translation, however, was diminished between pH 1·19 and 2·7.

2. Sensitized cholera vibrios have a negative charge between pH 4·5 and 10·5, show an isoelectric zone between pH 3·6 and 4·5 and have a positive charge below pH 3·6.

3. (*a*) The isoelectric point of an agglutinating serum with titre 1–15,000 was in the neighbourhood of pH 5·6 ; of one with titre 1–26,000 in the neighbourhood of pH 6·6.

(*b*) Cholera agglutinin, freed from the proteins of the serum, has a constant isoelectric point in the neighbourhood of pH 4·77.

The conclusions are drawn that :—(1) Since agglutination still takes place at a pH at which both cholera vibrios and specific agglutinin have negative charges, it cannot be ascribed to difference in the sign of the charges. (2) Since sensitized vibrios show difference in the sign of their charge from normal vibrios in the neighbourhood of pH 3·6 and have an isoelectric zone corresponding in part to that of purified agglutinin, we may infer that specific agglutination is due to a modification of surface tension, resulting in adsorption of agglutinin at the surface of the organism according to the law of Gibbs.

W. F. Harvey.

Ukil (A. C.). **The Action of Cholera Convalescent Serum on Comma Vibrios.**—*Calcutta Med. Jl.* 1928. July. Vol. 23. No. 1. pp. 1–4. [1 ref.]

Professor Ukil's work was based upon reports by Dr. P. N. Das and Dr. S. C. Basu concerning the marked reduction in mortality of cholera cases treated with convalescent serum. The author collected sera from over 40 cholera convalescents in the cholera ward of the Chittaranjan Hospital, Calcutta, and 30 of these form the subject

matter of this study. All the cases were bacteriologically diagnosed as being due to agglutinating Koch's vibrios. Macroscopic agglutination: 10 sera, 1/1,000; 9, 1/500; 6, 1/100, and 5 which did not produce agglutination of vibrios. As regards bacteriolysis *in vitro*: 18 sera gave complete dissolution (no growth of vibrios on plates); 7 gave partial dissolution and 5 very weak dissolution (large number of colonies on plates). For *in vivo* experiments lethal doses of vibrios were mixed with different dilutions of serum and injected into rabbits. The results, not very satisfactory, are given in a table.

J. H. T. W.

GARCIA (Onofre). **Notes on the Serological Relationship of the Cholera-like Vibrios isolated from Human Beings and from Waters in Manila.**—*Philippine Jl. Sci.* 1928. June. Vol. 36. No. 2. pp. 187–198. [2 refs.]

Three cholera-like vibrios were isolated from human cases, all of them haemolytic and identical in cultural and sugar reactions with true cholera vibrios. Sero ogically the three vibrios belonged to different groups. Sera were prepared from them and were used to determine the position of 250 strains of cholera-like vibrios isolated from shellfish, sewage, drinking water, and sea water. Only 5 of these, all water vibrios, gave agglutination reactions to the sera when tested in dilution of 1 in 1,600. Four agglutinated with one serum, one with the second and none with the third. A true cholera serum was also used in test, but neither the human cholera-like organisms nor the water cholera-like organisms were agglutinated by it. Absorption tests confirmed the simple agglutination tests and established the identity of the tested cholera-like water organisms with the cholera-like organisms isolated from human beings. "Cholera-like vibrios were frequently found in stools of healthy persons in the beginning or toward the end of outbreaks of cholera. Furthermore, non-agglutinable cholera-like vibrios may be found simultaneously or alternatively with agglutinable cholera vibrios in cholera patients and convalescents."

W. F. Harvey.

VICKERS (W. J.). **Cholera Control in Rural Areas with Particular Reference to Rubber Estates.**—*Malayan Med. Jl.* 1928. June. Vol. 3. No. 2. pp. 76–83. [14 refs.]

As regards general protection and sanitation on rubber estates this paper adds very little to the regulations laid down by Malcolm WATSON (this *Bulletin*, Vol. 25, p. 307); but the author enters more fully into the use of prophylaxtic vaccination, quoting figures for bilivaccine and anti-cholera vaccine from work done in India [this *Bulletin*, Vol. 25, p. 312 (LEAGUE OF NATIONS)].

J. H. T. W.

GRAHAM (J. D.). Recherches sur le choléra et la vaccination anti-cholérique dans l'Inde Britannique. [**Cholera and Anti-Cholera Vaccination in British India.**]—*Bull. Office Internat. d'Hyg. Publique.* 1928. May. Vol. 20. No. 5. pp. 702–709. [12 refs.]

This report refers to anti-cholera vaccine work done during 1927 in Bengal and Madras. Oral bile-vaccine and ordinary vaccine by

inoculation are compared. The results are in favour of subcutaneous inoculation. [See this *Bulletin*, Vol. 24, p. 923 (GRAHAM).]

J. H. T. W.

ZDRODOWSKI (P.). Recherches expérimentales sur la pathogénie du choléra. [**Experiments on the Pathogeny of Cholera.**]—*Ann. Inst. Pasteur.* 1928. Oct. Vol. 42. No. 10. pp. 1242–1258. [3 refs.]

These laboratory experiments on rabbits were undertaken to confirm and verify the similar work done by SANARELLI. SANARELLI's "Cholera Memoirs" are well known and have received notice in this *Bulletin*—see Vol. 21, p. 447; also Vol. 22, p. 769 (ZDRODOWSKI & BRENN).

J. H. T. W.

GRAHAM (J. D.). Travaux sur le bactériophage du choléra aux Indes. [**Work on the Bacteriophage of Cholera in India.**]—*Bull. Office Internat. d'Hyg. Publique.* 1928. Aug. Vol. 20. No. 8. pp. 1216–1231.

This is an official report on work already noticed in this *Bulletin*—see Vol. 25, p. 308 (D'HERELLE & MALONE); also p. 677 (ROSS, BAGCHI & ROY).

J. H. T. W.

DUGUET (M. L. F.), CAUSERET (P. J. J.) & ESCALIER (J. A. E.). La défense des territoires du Levant, placés sous mandat français, contre l'épidémie de choléra ayant sévi en Irak (juillet-décembre 1927). Exposé chronologique des faits et des mesures prises.—*Arch. Méd. et Pharm. Milit.* 1928. Aug. Vol. 89. No. 2. pp. 129–169. With 1 folding map.

PLAGUE.

ALLAN (W.). **Annual Report on Plague in Nigeria, 1927.**—*Ann. Med. & San. Rep. Nigeria, 1927.* Appendix E. pp. 91–105. With 3 folding maps.

Compared with 1926 there was a marked diminution in the number of cases both in Lagos and on the mainland, but as the incidence was low all over the world during 1927 it is impossible to interpret exactly to what the diminution is due, and if it is likely to be permanent. The figures for Lagos were : 155 cases with 151 deaths ; 4 cases of bubonic plague out of 45 recovered ; the other deaths were cases of septicaemic and pneumonic plague. On the mainland 242 cases were reported with 190 deaths. In the septicaemic type the primary bubo was usually large and necrotic, and the bacilli were more scanty than in the purely bubonic type. Examination of rats for evidence of infection was continued under the Director of Medical Research at Ereko Dispensary. Of 57,087 rats examined 675 showed positive results. Inquiries as to flea infestation of rats and of houses were carried out. Rodent destruction was carried out by deratting gangs and the importance of concrete floors for houses urged. Passengers by ship, canoe and road were inspected and third class passengers by ocean steamers were disinfected with their baggage before leaving Lagos. 15,141 persons were inoculated during the year, and inoculation of contacts was carried out as far as possible during the Ogere and Ifo epidemics.

J. H. Tull Walsh.

OTERO (P. Morales). **Epizootic Survey of the Epidemic of Bubonic Plague in Porto Rico in the Year 1921.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1927. Aug. Vol. 3. No. 2. pp. 51–58. With 2 charts & 1 map.

Of the 93 infected rats captured during the epidemic, nine belonged to *M. alexandrinus*, 21 to *M. rattus* and 63 to *M. decumanus*. The pathological conditions were those commonly found in rat plague ; but it was also noted at the beginning of the outbreak that some rats found dead did not show any microscopic lesion other than marked emaciation and intense anaemia. Inoculation into guineapigs showed that these rats contained virulent organisms of plague. 93 guineapigs were inoculated, one for each positive rat, but only 76 died. The 17 that resisted were killed after 21 days. *B. pestis* was detected in smears and by cultures. The presence of bipolar organisms should always be checked by experimental inoculation.

J. H. T. W.

NAESLUND (Carl) & STRÖMAN (Ragnar). **The Plague in Sweden in 1927.**—*Upsala Läkareforen. Forhandl.* 1928. June 16. N.S. Vol. 34. Nos. 1–2. pp. 289–297. [6 refs.] [Fejan Quarantine & State Bact. Inst.]

Up to a certain point this is practically the same story as that already noticed in this *Bulletin*, Vol. 25, p. 671 (KLING). The author states that during the discharge of cargo at Gävle (Gefle) not a single rat, dead or alive, was observed. The pure cultures obtained were both derived from case No. 3 (U.), in which plague bacilli could not be

discovered on the first bacteriological examination of bubonic material taken at Gefle. The first cultivation of plague bacteria was achieved 52 days after the patient had fallen ill, the second 66 days after. This shows that plague bacilli may occur in bubonic glands more than two months after the onset of the illness, and that one or more bacteriological examinations with negative results do not suffice to determine the existence of bubonic plague. The author says it is difficult to fix the source of infection. No dead rats were noticed on the voyage, and when the vessel was fumigated (before being released to discharge cargo) the score of rats found did not show any macroscopic signs of plague. Unfortunately the corpses were not examined bacteriologically; and apparently healthy rats may be carriers of plague bacilli. A plague bubo which was somewhat larger than a hen's egg took nearly five months to heal. Repeated treatment with serum in large doses appeared to have a very favourable effect on the process of healing both in plague sepsis and in bubonic plague.

J. H. T. W.

Comptes Rendus du Premier Congrès Antipesteux de l'U.R.S.S. Saratov du 31 mai au 3 juin 1927. [**Report of the First Plague Congress of Soviet Russia.**]—502 pp. With numerous illustrations. 1928. Saratov.

This Report gives a good idea of the activities of the plague workers in South-East Russia. Much of their work follows the lines indicated in previous publications, and adds to our knowledge of the local conditions that help to perpetuate the endemicity of plague in this region.

Within the period from October, 1925, to May, 1927, there were in South-East Russia 42 plague epidemics with 310 cases of which 294 proved fatal. The infection in 11 of the epidemics originated from domestic and field mice; 4 were from spermophiles; 3 from jerboas (*Dipodipus sagitta*); 4 from gerbilles (*Rhombomys opimus*); 4 outbreaks were associated with the sojourn of persons on the steppes, and were perhaps caused by the fleas of the steppe-rodents; and 7 outbreaks were traced to infection contracted at the slaughter of plague-infected camels.

In December, 1926, a Russian Mission investigated an outbreak with 23 deaths at Tchouloutay in Mongolia. The first was a bubonic case which had been infected from a diseased tarbagan; the remaining cases were of the pneumonic variety, and were infected one from another. The epizootic mortality—presumably from plague—in the tarbagans in this region occurs in summer and autumn; they are hunted remorselessly because their fur has a particular shade of colour which is specially prized.

Golov and Ioff give an account of the species of fleas that infest the various steppe-rodents. They conclude that fleas capable of biting man are found on nearly every rodent which plays an active part in the spread of plague in Russia, and that the transmission of plague to man during the epizootics is probably brought about by fleas. They devoted particular attention to the fleas (*Oropsylla silantievi*) of the marmot (*Marmota bobac*); *Ceratophyllus tesquorum* and *Neopsylla setosa*, the fleas of the spermophile; and *Ceratophyllus mohrzeckyi* and *C. consimilis*, the fleas of the house-mouse. They were able to transfer plague experimentally by means of these flea species to nearly every kind of rodent which is responsible for spreading

plague in South-East Russia. They obtained 40 positive transmissions, which resulted in 21 septicaemic cases and 19 bubonic cases among the animals thus infected; in the 19 bubonic cases there were 15 axillary buboes, a preponderance which is also met with in the spontaneous epizootics. Golov and Ioff observed proventricular blocking in *C. tesquorum* and in *C. laeviceps*, the gerbille flea; they also noted regurgitation of plague bacilli in *C. tesquorum*; and they are convinced that *Neopsylla setosa* and *C. consimilis* can transmit plague in the act of biting. They often observed that rodents devour infected fleas, and imagine therefore that the infection may sometimes penetrate by this means through the mucous membrane of the mouth.

Ioff has made a collection of fleas taken from man, domestic animals, rodents, and other mammals, both carnivorous and insectivorous. He has found 48 species of fleas, belonging to 22 genera, some of them hitherto undescribed. *X. cheopis* has been discovered in the little fishing villages near Astrakhan on the Caspian Sea, that is, near a port of a closed sea. Among 9,700 fleas examined there were 16 instances of rodent fleas having been captured in human habitations, either in the beds or on the bodies of the occupants. The Report does not state whether these observations were made during the epidemic or the non-epidemic season.

Golov and Ioff have proved by experiment that plague bacilli do not survive in the developmental stages of the fleas that infest the steppe-rodents, a result which confirms the work of Bacot on this subject. They confirmed, too, the results of the Indian Plague Research Commission, who showed that the longevity of infected fleas, whether kept fed or without food, varies inversely with the temperature at which they are stored. The Russian observers found that starved fleas, when kept at 37° C., lived for only 5 days; whereas at 0°–15° C. they lived for 396 days. They succeeded in transmitting plague by fleas which were maintained without food at the temperature of the cellar during a period of 150 days.

Nikanorov and Gaisky conclude that the rodent fleas can without doubt transmit the infection during the epizootic and the epidemic season, but that they are unlikely to act as carriers of the infection over prolonged periods. They believe that apart from the epizootics both man and the rodent may carry plague bacilli [a conclusion which is opposed by evidence from other sources.]

The infectivity of fleas in spermophile burrows was tested in a region in which destructive measures with CS_2 and Cl_2 had been organized. In spite of this treatment the fleas remained alive during the winter in the nests situated in the burrows. The fleas proved to be non-infective, and the conclusion is drawn that they probably do not act as carriers of the plague bacillus from one season to another. [On the ground that owing to the death of the hosts, the conditions in which the observations were made were unnatural, the present writer does not feel convinced of the validity of this conclusion.]

An epizootic in field mice (*Lagurus lagurus*) appeared for the first time in 1927 in South-East Russia. The fleas collected in the deserted nests were shown by guineapig tests to be infected.

In this Report there will be found three notes on the biology of the steppe-rodents with special reference to the spermophile (*Citellus musicus* Ménét) and the jerboa (*Dipodipus sagitta*). Such matters as their habits of life, hibernation, food supply, and the nature of their burrows are discussed.

An account is given of the measures for spermophile destruction that have been carried out in South-East Russia by means of CS_2 and Cl_2. Nearly $6\frac{1}{4}$ million spermophiles were destroyed over an area of 212 square miles (51,000 hectares) in localities where epizootics were known to exist. Chemical fumigation as a preventive measure after an epizootic has broken out is not recommended.

A summary of the work of GRIAZNOV on the chemical fractionation of the plague bacillus is so condensed that the various steps are difficult to follow. He found that a lipoid fraction constitutes nearly 7 per cent. of the total weight of the dried bacilli. A note by GOUBAREV on the autolysis (proteolysis) of the plague bacillus also suffers from undue condensation.

There are three papers on the differential diagnosis between *Past. pestis* and *B. pseudotuberculosis rodentium.* In the first it is stated that the value of the glycerine medium of Colas-Belcour has not been confirmed because all the strains examined turned the medium acid. In the second paper NIKANOROV describes how it is possible in most cases to distinguish between the two organisms by taking advantage of the circumstance that the pseudotubercle bacillus produces relatively more alkali during its growth than the plague bacillus ; the difference is readily made apparent by using a culture medium with a suitable indicator. Thus the pseudotubercle bacillus changes a thymol-blue medium to a dirty-green colour, whereas the plague bacillus produces no change after 3 to 5 days growth. The author admits, however, that owing to the existence of extreme varieties of both the plague bacillus and the pseudotubercle bacillus the test is not an absolutely differential one. ZLATOGOROV and MOGILEVSKAÏA in a third paper on the subject state their belief that maltose and glycerine media are not truly differential, and that the whole question remains an open one. By plating out 3 strains of the pseudotubercle bacillus from broth cultures every 7 days they obtained about the third week variants with antigenic properties that were different from those of the original cultures. [None of the Russian authors appears to be aware of the motility test for distinguishing the plague bacillus from the pseudotubercle bacillus. The motility of the latter organism is specially apparent in cultures grown at room temperature : an old observation rediscovered a short time ago by ARKWRIGHT.]

The Report contains three articles on experimental plague in the guineapig, and one on the results of feeding spermophiles with plague bacilli. A purely intestinal form of plague was not observed, and since plague bacilli were not very often found in the intestinal contents of the experimental animals it is considered that the excreta of plague animals do not favour the spread of the disease to any important extent : a conclusion which supports work that is already firmly established.

Lastly a description is given of a mysterious outbreak in man characterized by glandular swellings, 75 per cent. of which were inguinal or femoral. There were 150 cases in the summer of 1926 in the region of the lower basin of the Volga. The disease was not plague ; it was feebly contagious ; children were chiefly affected ; and there were no deaths. A description is extant of a similar disease in the summer of 1877 in the same region ; there were 200 cases and all recovered. The recent outbreak was associated with a small coccobacillus, which, it is thought, may be *Bact. tularense.* The large number of cases is a point against the diagnosis of tularaemia. The

disease is supposed to have had some connexion with an inundation, which was followed by an exceptional migration of water rats into the houses.

G. F. Petrie.

Office International d' Hygiène Publique. Les faunes régionales des rongeurs et des puces dans leurs rapports avec la peste. Résultats de l'enquête du comité permanent de l'office international d'hygiène publique 1924–1927. [**The Geographical Distribution of Rodents and Fleas in relation to Plague.**] [Rapporteur : Jorge (Ricardo).] Etude systématique descriptive des puces des rongeurs transmettant la peste [Roubaud (E.).]— 306 pp. With 10 plates, 7 figs., 2 maps & 4 diagrams. 1928. Paris : Masson et Cie., Editeurs, 120 Boulevard St. Germain.

This useful work assembles in a concise and easily accessible form numerous observations on plague-carrying rodents and their fleas. The data have been arranged as separate reports contributed by authorities in the various countries that have suffered from plague during the present pandemic or that are open to the risk of attack. Most of the countries of Europe are represented, and there is an admirable review of British observations, but curiously no account has been furnished of plague experience in France within recent years ; this is unfortunate, because the present reviewer at least has not yet succeeded in discovering an authoritative analysis of the limited outbreak that occurred in Paris a few years ago. The account of plague in Java seems to be unduly brief ; a report compiled by one of the well-known plague workers in Java would have been welcome. Nikanorov gives an excellent compendium of recent plague work in Russia, and the large-scale observations on the distribution of rat-flea species in the United Provinces in India are adequately presented by Graham and by Mital. Professor Ricardo Jorge, Director-General of Public Health in Portugal, has written an introductory article which summarizes the detailed reports that follow, and by his fresh and allusive style has contrived to give an entertaining account of the subject.

The Report as a whole is too full of detail for abstraction in strict geographical order ; the following notes are therefore brought together without reference to their exact sequence in the volume.

For the two important plague-bearing rats the genus *Epimys* (Trouessart, 1881) is generally adopted, but in England the name *Rattus* (Fitzing, 1867) is preferred. The specific name *decumanus*, given to the brown rat by Pallas in 1778, has been replaced by *norvegicus*, the name given by Erxleben in 1777. This name suggests that the brown rat is a native of Norway, but actually it reached that country last in its migration through Europe. A black variety of *R. norvegicus* was first noted in Ireland in 1837, and was named *Mus hibernicus* ; it is becoming more widespread. Hinton refers to 3 subspecies of the black rat : (1) *Rattus rattus rattus* (the type species : a European variety) ; (2) *Rattus rattus alexandrinus* (Asia Minor and North Africa) ; and (3) *Rattus rattus frugivorus* (the roof or tree rat : a Mediterranean variety). The second and third of these sub-species are found in colonies that inhabit roof kitchens and restaurants in various parts of London. Jorge remarks that there are black rats that are brown, and brown rats that are black, and grey rats in both

groups; he therefore suggests that a chromatic dichotomy has no value for purposes of differentiation or classification.

R. rattus disappeared from England and other European countries only after the middle of the last century, and therefore the immunity of Europe from plague cannot be explained by the change in the rat fauna, but is to be traced rather to the progress of civilization with its higher standards of individual and public health.

R. rattus is the commonest species of rat in Palestine and Ceylon. In Uganda it is the prevalent species, and indeed *R. norvegicus* is unknown there. In 1908 *R. rattus* was not found in Accra, whereas to-day it is much more numerous than *R. norvegicus*, which was then the most commonly found species. *R. rattus* is apparently almost the only species captured on ships at Amsterdam.

R. norvegicus forms 70 per cent. of the rat population in Iraq; 90 per cent. in Mauritius; and it is the predominant species in the Straits Settlements and in Hong Kong.

Hinton has drawn attention to the risk of the introduction and spread of plague among the grey American squirrels (*Sciurus carolinensis*), which are now becoming distributed over the whole of Great Britain; but there is no mention of experiments on the susceptibility to plague of this species.

Spermophiles are the chief transmitting agents of plague in the steppe-region of South-East Russia, just as mice are the important carriers in the sandy region of the South. There is a regular coincidence between epizootics among mice, human epidemics, and good crops of *Agriophyllum "orenorium"* (*Koumartchik*), a plant which provides food, shelter and nesting material for the mice. There is a relation, too, between plague outbreaks and the time of cropping *Kiak* (*Elymus sabulorus*), a shrub whose long and numerous roots consolidate the soil, and so create favourable conditions for sheltering the nests of mice. It is singular that, notwithstanding their abundance, house and field mice in the steppe-region of South-east Russia do not contract plague. Jorge comments upon the surprising circumstance that, contrary to experience in other countries, the domestic mouse in South Russia acts as a plague carrier.

The problem of the relative importance of *X. cheopis* and *X. astia* has not yet been solved. Both Graham and Mital consider that the results of the work done so far in India do not permit firm conclusions to be drawn, partly because there are inexplicable variations, both local and seasonal, in the distribution of these flea species. Mital and his colleagues have examined one-third of a million fleas taken from rats captured in various localities in the United Provinces. Of the total number 54 per cent. were *X. astia*, 42 per cent. *X. cheopis*, and 3·5 per cent. *Ceratophyllus*. Mital states that the coefficient of correlation between the percentage figures for *X. cheopis* and the yearly plague rates is negligible. In 1923 there was a high mortality from plague in Banda Town at a time when the *cheopis* ratio was low.

X. cheopis is the predominant rat-flea in Singapore and Penang, and thus the freedom of the Malay States from plague is not attributable to the substitution of *X. astia* for *X. cheopis*, but is to be ascribed rather to climatic conditions and especially to the high temperatures prevalent there.

X. astia was found in May, 1922, on *R. norvegicus* and *Cricetomys gambianus* in the Gold Coast; previously it had not been found in Africa.

X. brasiliensis is apparently not commonly found in India. Africa is its ancestral home, but it has spread to South America; hence its name. It is the predominant species in Uganda, Kenya and Nigeria, and it seems to be capable of transmitting plague from rat to rat and from rat to man. For example, in Kabete it was almost the only species of flea found on *R. rattus* in huts in the infected districts. Plague in Kenya has never been as destructive as might be expected from a consideration of the climate, the conditions in the native houses, and the very large rat population.

Neither *X. astia* nor *X. brasiliensis* has been found in the United States of America. During 1926 the laboratory of the quarantine station of New York examined 6,274 fleas from 12,808 rats obtained from 635 ships after fumigation with HCN. The results were as follows:—

X. cheopis	5,521	*L. musculi*	54
X. astia	27	*Ctenocephalus canis* or *felis*	9
X. brasiliensis	4	*P. irritans*	1
C. fasciatus	653	Not identified	5
		Total	6,274

Of 480 fleas taken from rats captured in Bombay City during September, October, November (? 1925) there were 276 *X. cheopis*, 150 *X. astia* and 54 *X. brasiliensis*.

In the report from the United States an index of risk from plague or, otherwise phrased, an index of epidemicity is formulated with due reservations. When the yearly mean of fleas per rat is less than 5, and when the predominating flea is other than *X. cheopis*, there is probably no danger of a serious outbreak of plague; but when the figure is over 5, and the prevalent flea is *X. cheopis*, bubonic plague may appear and, if it does, the incidence will be directly proportional to the average number of fleas per rat. In his introductory statement JORGE expresses doubt as to the value of this measurement, and it certainly seems that in oriental countries at least the factors that govern the severity of plague epidemics are too numerous and complicated to permit of their inclusion within the limits of a simple formula such as this.

The Report contains a paper by Lt.-Colonel W. H. C. FORSTER on the forecasting of plague epidemics in the Punjab. His analysis of the statistical data of plague in this Province for the past 26 years shows that a depression of the seasonal curve in December is correlated with a mild outbreak in the following spring. The diminished mortality is probably associated with a lack of rain in the month of November, which exerts a harmful influence upon the life-cycle of the rat-flea.

The Report as a whole gives ample evidence of a general belief in the outstanding importance of the rat-flea in the spread of human plague. The author of the report from Italy seems to regard the fact that plague may occur in rats without a corresponding human outbreak as a point against the view that the rat-flea plays a dominant rôle in the transmission of plague to man; he cites the experience at the Port of Genoa as an example. This argument has been dealt with by SWELLENGREBEL in one of his papers, but it may be pointed out here that the question is one of chance and of the proximity and length of exposure of man to the infected rat-flea, and that in European conditions the chances must often favour the escape of the person at risk. No one with experience of conditions as they exist in the East can doubt that the chances

of infection are considerably greater than they are likely to be in civilized countries.

The volume ends with a chapter compiled by ROUBAUD, which gives a systematic description, with illustrations, of the chief types of rodent **fleas.**

G. F. Petrie.

URIARTE (Leopoldo). Breves antecedentes para el estudio de la peste bubónica. [**Notes for Study of Bubonic Plague.**]—*Rev. Inst. Bacteriológ.* 1927. July. Vol. 4. No. 8. pp. 765–772. With map on p. 774. [English summary pp. 772–773.]

Since plague first appeared in the Argentine experience has proved that the rat is the normal reservoir of the virus and that it preserves and spreads it. The predominent species is *M. decumanus*, followed by *M. rattus* and *M. alexandrinus*. Sometimes bags of grain have contributed to the spread of the disease. The species of flea most commonly found is *X. cheopis*. Natural plague has been proved twice in the *Cavia aperea* [this *Bulletin*, Vol. 22, p. 377.] There is no bacteriological proof that other wild rodents are affected.

J. H. T. W.

GOYLE (A. N.). **Comparative Experiments on the Transmission of Plague by Fleas of the Genus** *Xenopsylla* (*Cheopis* **and** *Astia*) **with a Discussion on the Flea-Species Distribution in its Relation to the Incidence of Plague.**—*Indian Jl. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 837–860. With 1 chart. [23 refs.] [Provincial Hygiene Inst., Lucknow, India.]

A further contribution to the comparative experiments on plague transmission among rats by *X. cheopis* and *X. astia*. These have yielded similar results to those previously recorded. Males of *cheopis* and *astia* carry infection more readily than the females and the males have a shorter duration of life than the females. *X. cheopis* lives longer than *X. astia* [see this *Bulletin*, Vol. 24, p. 930 (HIRST); 932 (GOYLE)].

J. H. T. W.

WU LIEN TEH. [**Hibernation Experiments in Plague.**]—*Jl. Oriental Med.* 1928. Aug. Vol. 9. No. 2. [In Japanese. English summary pp. 17–20.] [Manchurian Plague Prevention Service, Harbin.]

The author states that the problem of plague in hibernating rodents is of practical as well as of theoretical interest. Certain species subject to prolonged hibernation are known to be the source of human infection during the warm season of the year. Are these rodents true carriers of plague throughout the year, or do they only suffer from plague while awake? GAISKI (1915–1926) found that of 30 susliks of S. Russia infected while hibernating 21 died more or less quickly. The work of GOLOV and IOFF is also mentioned [see this *Bulletin*, Vol. 24, p. 937]. DUJARDIN, BEAUMETZ and MOSNY found that while a non-hibernating Alpine marmot died quickly after infection two others which slept survived for 61 and 115 days respectively. They showed foci of chronic pneumonia and the bodies contained plague bacilli, but there were no buboes. The

author's experiments with hibernating Siberian marmots show that, infected with plague, they may continue to sleep and succumb considerably later than those infected while awake.

J. H. T. W.

Fonquernie (J.). Note au sujet du traitement de la peste pulmonaire. [**Treatment of Pneumonic Plague.**]—*Bull. Soc. Path. Exot.* 1928. July 11. Vol. 21. No. 7. pp. 600–601.

Between June 9 and December 31, 1927, seventeen cases of pulmonary plague occurred. They all died. They are said to have received anti-plague vaccine 2–4 days before the outbreak ; and in one case serum was employed for treatment. Other forms of treatment included : cardiac tonics and camphor oil, " fixation " abscess, intravenous injections of electrargol or collargol 20 per cent. ; and intravenous injections of iodine (neoiodine or strong solution of Lugol).

J. H. T. W.

de Smidt (F. P. G.). **Bacteriology of Nairobi Plague Prophylactic.**—*Kenya & East African Med. Jl.* 1928. June. Vol. 5. No. 3. pp. 77–92. [12 refs.]

The clear top fluid of the Haffkine plague prophylactic vaccine, as prepared at Nairobi, contains 40 to 50 mgm. dissolved protein in 100 cc. Immunizing potency is almost wholly restricted to this top fluid and its dissolved protein constituents give rise to the severe local and general reactions of plague vaccine. It would be very desirable to have a vaccine of equal immunizing power, but with less disturbing reaction. An auto-digest of pancreas is used as culture medium. The minced pancreas in water is incubated at 37° C., filtered and the filtrate sterilized. A 20 per cent. strength of this filtrate, with 1 per cent. peptone and 0·5 per cent. sod. chloride forms the medium for growth of *Past. pestis* (bacillus pestis). Incubation is carried on first at 30° C. and then at room temperature, with shaking of cultures at intervals of 3 days. The cultures are sterilized by 1 per cent. phenol at the end of 12 weeks and this vaccine is kept for at least 5 weeks before issue to reduce, as far as possible, its toxicity. In a good average sample of broth vaccine there is found 0·45 to 0·55 mgm. sediment per cc. and 40 to 50 mgm. dissolved protein per cent. Standardization is based on these values, and a satisfactory vaccine should contain 0·85 to 1 mgm. per cc. of bacterial solids in suspension and solution. Experimental work on a limited number of rats has shown the efficacy of the standard vaccine and also the inefficiency of a weak vaccine, such as is represented by one containing only 0·53 mgm. suspended and dissolved solids per cc.

W. F. Harvey.

Zlatogoroff (S. J.) & Moghilevskaïa (B.). Composition des cultures du bacille de la pseudotuberculose des rongeurs et parenté de ce bacille avec le bacille de la peste. [**Composition of Cultures of the Bacillus of Pseudotuberculosis of Rodents and its Relation to** *Past. pestis.*]—*C.R. Soc. Biol.* 1928. July 13. Vol. 99. No. 24. pp. 506–507. [Bact. Inst., Kharkov, Ukraine.]

Two strains of *Past. pseudotuberculosis rodentium* were used and were sown from bouillon containing only a minute amount of peptone, on to

nutrient agar plates. Smooth and wrinkled types of colony were obtained, corresponding respectively to the smooth (S) and rough (R) colonies of ARKWRIGHT. The smooth colony organisms were very virulent for guineapigs, whilst the wrinkled colony organisms were comparatively avirulent. In their fermentation of carbohydrates the smooth colony organisms resembled *Past. pestis* whilst the wrinkled colony organisms gave the fermentations of *Past. pseudotuberculosis rodentium*. Thus the dissociation of cultures of the pseudotuberculosis organism shows that they contain elements differing in no respect or only in degree from plague cultures.

W. F. Harvey.

LEESON (Frank). **A Plague-like Septicaemia of the Wild Rat** *Cricetomys gambianus.—West African Med. Jl.* Lagos. 1928. Oct. Vol. 2. No. 2. pp. 130–131. [4 refs.]

As a plague preventive measure examination is made of dead rats and other wild rodents for *Past. pestis* (Bacillus pestis). The author has observed in the course of this work a septicaemic condition along with pathological conditions which might easily be mistaken for plague infection. The organism isolated was not unlike the plague bacillus, but was readily distinguished from it by cultural characters. It gave acid and gas in a large number of sugars, was indol-negative, gram-negative, and pathogenic for rats. [One would almost require to demonstrate the existence of this septicaemic condition, as a disease of living rats in nature, in addition to isolating the organism from dead rats.]

W. F. Harvey.

RANGANATHAN (K. S.). **An Epizootic in Squirrels at Kumbakonam.—** *Indian Med. Gaz.* 1928. Oct. Vol. 63. No. 10. pp. 578–579. [King Inst. Preventive Med., Guindy, Madras.]

The occurrence of an epizootic of what looks like plague in squirrels without coincident disease in rats or men is recorded. Of smears from four squirrels found dead in two adjacent bungalows in Kumbakonam Extension between September 28 and October 6, 1927, all showed bacilli morphologically indistinguishable from plague bacilli. Five more died between the 23rd and 25th September and two more on October 4th. All showed bacilli resembling *Past. pestis*. 113 rats were examined but showed no signs of plague ; 114 captured squirrels were examined but no abnormal appearances were observed and no plague bacilli were found in smears from spleen and liver. All the squirrel fleas belonged to the species *Ceratophyllus argutus*. In the absence of cultural or animal inoculation tests one cannot be certain of the diagnosis.

J. H. T. W.

WU LIEN TEH. **The Perpetuation of Plague among Wild Rodents.**—*Amer. Jl. Hyg.* 1928. Sept. Vol. 8. No. 5. pp. 649–670. [21 refs.]

This is a general paper containing material for experiments on rodents during hibernation—see this *Bulletin*, Vol. 24, pp. 32–34 (GAISKY to SKORODUMOFF) ; p. 456 (WU LIEN-TEH).

J. H. T. W.

Boletin de la Oficina Sanitaria Panamericana. 1928. Sept. Vol. 7. No. 9. 1055–1064. With 5 figs. La " antirratización " (Ratproofing) de los edificios como medida contra la peste. [**Rat-proofing of Buildings as an Anti-Plague Measure.**]

Rat-destruction is a purely temporary measure undertaken at the time when plague is present in a community, but is futile, unless rat-proofing of buildings is carried out, in preventing future epidemics. This article gives in detail a " Model Ordinance " for rendering buildings rat-proof. Minute details for building-construction are laid down, stating that the foundations are to be of concrete of at least 7·5 cm. thick, the floors also of concrete, 15 cm. thick, and the same material is to be used up to a height of 60 cm. above the level of the ground. If the building is raised on piles, these are also to be of concrete. Inspectors are to be appointed to see that these and other regulations are duly fulfilled. The article is well illustrated with photographs showing buildings, on the ground and on piles, constructed mainly of wood, which were heavily infested by rats, and also some of the buildings under construction with the new materials, and erected in accordance with the measures laid down in the ordinance.

H. Harold Scott.

Advier (M.). Considérations sur le traitement de la peste en Emyrne.—*Bull. Soc. Path. Exot.* 1928. July 11. Vol. 21. No. 7. pp. 598–600. [1 ref.]

Gambier (A.). La peste au Cambodge.—*Bull. Soc. Path. Exot.* 1928. July 11. Vol. 21. No. 7. pp. 497–503. With 1 text fig.

League of Nations Monthly Epidemiological Report. 1928. June 15. Vol. 7. No. 6. pp. 232–233. The Epidemic of Plague at Aden.

United States Naval Medical Bulletin. 1928. July. Vol. 26. No. 3. pp. 776–777.—An Epidemic of Plague in Aden, Arabia.

Uriarte (Leopoldo). Sobre profilaxis de la peste bubónica.—*Rev. Inst. Bacteriológ.* Buenos Aires. 1927. Nov. Vol. 5. No. 1. pp. 5–16. English summary pp. 17–18.

Zeiss (H.). Pest im Südosten (Nachtrag) und im fernen Osten. IV. Die Pest in Russland.—*Muench. Med. Woch.* 1928. Feb. 10. Vol. 75. No. 6. pp. 271–273. [4 refs.]

TROPICAL DERMATOLOGY.

MENDELSON (R. W.). **Some Interesting Skin Diseases observed in Natives of the Tropics.**—*Southwestern Med.* 1928. Oct. Vol. 12. No. 10. pp. 440–443. With 11 text figs.

The following cases, figured in the text, are reported from Siam: (1) Multiple papillary adenomata of the sweat glands; (2) Dermatitis cupoliformis; (3) Tinea labialis in a betel nut chewer; (4) Endothelial sarcoma of the tongue; (5) Granuloma fungoides; (6) Basal celled carcinoma originating in sweat glands; (7) Chronic glanders. This last had been diagnosed as syphilis and as carcinoma. [These case reports are all too brief for abstraction.]

W. Jenkins Oliver.

MEDEIROS (Mauricio). Contribution brésilienne à la connaissance de certaines mycoses tropicales. [**Brazilian Contributions to the Knowledge of Certain Tropical Mycoses.**]—*Bull. Soc. Path. Exot.* 1928. June 13. Vol. 21. No. 6. pp. 419–427.

The author gives a brief general review of the work done in Brazil on tropical mycoses, especially in the Oswaldo Cruz Institute, and concludes that among Brazilian mycoses there are forms which: (*a*) are clinically and parasitologically similar to European forms; (*b*) are clinically peculiar to Brazil although the parasites are the same as elsewhere (i.e., blastomycoses); and (*c*) are due to special parasites which are being investigated by Brazilian workers.

P. Tatè.

DUBREUILH (W.). Dermatomycoses tropicales. [**Tropical Dermatomycoses.**]—*Jl. Méd. de Bordeaux.* 1928. July 10. Vol. 105. No. 13. pp. 519–521.

This communication gives a well condensed account of the various tropical dermatomycoses by the simple classification of the affections into two main groups: A. Trichophytoid dermatoses; (i) Dhobie itch; (ii) T. circinata (iii) T. imbricata. B. Parasitic "dyschromias"; (i) Pityriasis versicolor flava (Castellani) (ii) Pityriasis versicolor nigra (Castellani); (iii) T. albigena, de Nieuwenhuis; (iv) various forms of carate. Each of these subdivisions is briefly described as regards the clinical appearances and the appropriate treatment of the same.

W. J. O.

CASTELLANI (A.). **The Treatment of Epidermophytosis of the Toes (Mango Toe) and Certain Other Forms of Epidermophytosis by a Fuchsin Paint.**—*Lancet.* 1928. Sept. 22. pp. 595–596. [1 ref.]

The paint advocated for eczematoid mycotic infections of the toes and fingers and for pruritus ani et vulvae of mycotic origin consists of carbol fuchsin 100 cc., ac. boric 1 gm., acetone 5 cc., resorcin 10 gm. The paint is applied with cotton wool to the affected parts 2–3 times daily for 1 week, then after 3 days' rest re-applied 1–2 times per day for another week or over a longer period as required.

W. J. O.

Deland (C. Mervyn). **Interdigital Ringworm.** [Correspondence.]—*Brit. Med. Jl.* 1928. Nov. 3. p. 822.

Interdigital ringworm of the feet is reported to be a common condition in Santa Cruz, British Solomon Islands, occurring mainly in white men working in deep mud or in salt water. The writer detected a ringworm fungus " apparently the common Tinea imbricata." For treatment a 5 per cent. copper oleate ointment is recommended, while the feet must be kept dry.

W. J. O.

White (Cleveland). **Mycotic Inguinal Lymphadenitis associated with Superficial Fungus Dermatitis of the Feet. II. Studies in Mycotic Dermatitis.**—*Arch. Dermat. & Syph.* 1928. Aug. Vol. 18. No. 2. pp. 271–275. [4 refs.]

Report of a case, concerning a male, of enlarged inguinal glands in association with ringworm of the toes and feet. The fungus was observed microscopically both in the scales from the skin lesions and in the fluid aspirated from a gland. Cultures from each area were positive showing *Trichophyton interdigitale*. A blood culture was negative for fungi. Out of 648 cases of superficial ringworm (mostly of the feet) 7 presented varying degrees of inguinal adenopathy, three of which had in addition some fever and mild constitutional symptoms, and one case showed unilateral axillary adenopathy secondary to an acute eruption on the fingers.

W. J. O.

Catanei (A.). Trichophytie expérimentale, à *Trichophyton violaceum*, du singe d'Algérie. [**Experimental Trichophytosis of the Algerian Monkey with** *Trichophyton violaceum*.]—*C.R. Soc. Biol.* 1928. June 29. Vol. 99. No. 22. pp. 292–293. [Pasteur Inst., Algiers.]

Two Algerian monkeys (*Macacus inuus*) were inoculated by scarification with *Trichophyton violaceum* Bodin [*Bodinia violacea* (Bodin)]. Inoculations were made both with parasitized hairs and with cultures of 27 days' growth on Sabouraud's glucose agar, and were positive in all cases, after an incubation period of about 15 days. The lesions persisted for at least 3 months, and the hairs were attacked in a similar manner to human hairs.

P. Tate.

Ramos e Silva (J.). Sobre o pityriasis versicolor tropical. A questão das achromias parasitarias ; a achromia residual. [**Tropical Pityriasis versicolor; Parasitic Achromia; Residual Achromia.**]—*Ann. Brasileiros Dermat. e Syph.* 1927. Dec. Vol. 3. No. 1–4. pp. 1–11. With 6 text figs. [7 refs.]

Cases of a cutaneous affection of the face and neck associated with loss of pigmentation are described and photographs illustrate the condition. Mycelial growth was found, but culture on Sabouraud's medium was not successful. The author discusses the differences between Pityriasis versicolor, which does not attack the face and is readily cured, and Tinea flava of which these cases were probably examples, clearing up with local application, first of resorcin, later of diluted tincture of iodine. In one case there was associated with the

cutaneous achromia a macular hyperchromia of the buccal mucosa. He mentions also the fact that other cutaneous affections, pinta for example, may after clearing leave areas permanently deficient in pigment.

H. Harold Scott.

Smith (E. C.). **Tinea Flava (Castellani).**—*Jl. Trop. Med. & Hyg.* 1928. July 16. Vol. 31. No. 14. pp. 169–173. With 12 text figs. [4 refs.] [Med. Research Inst., Lagos.]

Contains a very brief description of the clinical appearances of the affection. Emphasis is laid upon the invariable localization of the macular lesions about the hair follicles. Attempts to infect the unscarified normal skin of both Europeans and Africans with scales from infected persons and with cultures of the fungus were negative. The cultures on Petroff's media were "greyish white in colour with a structural formation resembling rock coral." These showed "various sized yeast-like gram positive bodies, many having a shape suggestive of ninepins. In old cultures (60 days) short hyphae were present in connexion with some of the bodies." This article is well illustrated.

W. J. O.

Hoffmann (W. H.). Die Chromoblastomykose in Cuba. [**Chromoblastomycosis in Cuba.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Sept. Vol. 32. No. 9. pp. 485–487. [Finlay Lab., Health Ministry, Havana, Cuba.]

A piece of infected skin from a case in the interior of Cuba was sent to the author for investigation. Clinically the condition appeared to be blastomycosis; and histological examination resulted in a diagnosis of "Chromoblastomycosis" or "Tropical blastomycosis," which is supposed to be caused by the fungus *Phialophora verrucosa*. He thinks that this disease is the same as the disease of unknown origin called "Chappa," cases of which were described by Guiteras in Cuba in 1904, and by Read from West Africa in 1901. He believes that further investigation will prove that chromoblastomycosis is not confined to the skin but involves bones and joints, and becomes a generalized, mutilating, disease as in other blastomycoses.

P. Tate.

Buschke (A.) & Joseph (A.) Dermatitis verrucosa (Chromoblastomykose). [**Dermatitis verrucosa (Chromoblastomycosis).**]—*Dermat. Woch.* 1928. July 28. Vol. 87. No. 30. pp. 1047–1049. With 4 text figs. ["R. Virchows" Hosp., Berlin.]

The authors investigated material obtained by biopsy from Hoffmann's case in Cuba [see above]. Dermatitis verrucosa was first observed by Pedroso and Gonres in Brazil in 1911; and was later found in N. America, several times in central Brazil, French Guiana and Rhodesia. As they have heard of a case from South Russia they consider that it may be widely distributed.

The disease nearly always affects bare-footed natives, especially agricultural labourers; and the parasite, which presumably lives saprophytically in nature, enters through a superficial wound. It runs a very chronic course, and starts as small whitish tubercles, which

unite to form cauliflower-like proliferated masses, with cornified surfaces and soft centres. Legs, hands and feet may be affected, but neither the mucous membrane nor internal organs are ever invaded.

The authors' histological investigation confirms the account of Rocha da Lima (1923). There is a strong cellular infiltration of the cutis, which sends pointed proliferations towards the epidermis which become cornified at their extremities. A characteristic feature is the presence of sharply-defined nests of epitheloid cells in which, either lying free between the pus cells, or enclosed in giant cells, are roundish or angular, brown, double-contoured, yeastlike cells. On ordinary media bluish grey colonies developing sclerotia and spores are formed. According to Thaxter the fungus belongs to the sub-family *Chalareae* of the *Dematiaceae*. To this group also belongs the fungus found by Terra, Torres and Fonseca & Leão named *Acrotheca pedrosoi* which causes a dermatitis with a similar clinical aspect. Treatment with potassium iodide is of use in both conditions.

P. Tate.

Fox (Howard). **Carate (Pinta) as observed in Colombia, South America.**—*Arch. Dermat. & Syph.* 1928. Nov. Vol. 18. No. 5. pp. 673–688. With 10 text figs. [10 refs.]

A brief description of the disease as recounted in the literature is followed by a general account of the author's personal observations of fifty cases of the bluish carate with depigmentation. "A feature especially striking . . . was a peculiar, fine, reticulated, mottled or variegated appearance of some of the lesions. . . . partly due to partial depigmentation and partly to bluish or brownish hyperpigmentation." In every case the eruption involved the extremities, though the palms and soles showed nothing that could be definitely regarded as a manifestation of carate. Both itching and scaling were inconspicuous features. Epidermal scrapings from 20 patients revealed the presence of fungus in only one slide on microscopical examination. Of the various moulds grown culturally Aspergillus was most frequently found, Penicillium, other higher fungi and unidentified Trichophytons were grown in a dozen cases. Histological investigation showed vacuolization of the rete cells, absence of elastic fibres in the papillae and in the subpapillary region and pigmentary dystrophy. In two cases a large number of chromatophores were observed in the perivascular infiltration of fibroblasts in the subpapillary area. While the disease apparently was not a contagious one its aetiology was undetermined, climatic conditions and lack of proper hygiene being probable predisposing factors.

W. J. O.

Register (J. C.). **Wassermann, Kahn, and Meinicke (M. T. R.) Reactions in Caraate.**—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1927. pp. 262–263. [1 ref.]

Menk (1926) found 69·5 per cent. of 67 cases of caraate (pinta) to be strongly Wassermann positive. These cases were all under treatment for ailments other than caraate. The author has tested the blood serums of 207 otherwise apparently healthy cases of caraate in various stages—blue, black, red, and white lesions of the skin occurring either alone or in some combination. The Wassermann test was applied to

all 207 cases, the Kahn test to 117, and the Meinicke (M. T. R.) to 148 of them. The Wassermann was strongly positive in 80·6 per cent.; Kahn in 81·1 per cent., and Meinicke in 74·4 per cent.

[An editorial note disclaims belief that this high rate of strongly positive reactions confers on caraate the distinction of being a peculiar manifestation of syphilis.]

H. M. Hanschell.

Delamare (G.) & Gatti (C.). L'évolution des kystes de la piedra paraguayenne. [**Development of Cysts of Paraguayan Piedra.**]—*C. R. Acad. Sci.* 1928. June 18. Vol. 186. No. 25. pp. 1771–1772.

A biological description of the evolution from the adult mycelial cells of the cysts of Horta which in their turn give rise to rape-seed-like elements (generally 6–12 from each cyst) with a double contour, some of which by transverse fragmentation of the protoplasm come to resemble a segment of mycelial hypha. No cultures had been obtained from these bodies. The number of such elements is too variable to furnish any absolute differentiation between the two varieties of *Trichosporum Hortai*.

W. J. O.

Indian Medical Gazette. 1928. Aug. Vol. 63. No. 8. pp. 453–455.—**Mycetoma Infection: an Appeal for Material.**

Workers all over India are requested to send mycetomic material in the form of cultures, infected tissues, clinical notes, information and photographs of cases to:—Lt.-Col. H. W. Acton, I.M.S., Director, Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

In making cultures the grains, if possible, should be taken only from sinuses which have not been opened up; and, if the pustule is open, the grains should be washed in saline and then heated in saline at 56° C. for 10 minutes. Two grains should be planted on each tube of medium and at least 3 tubes should be inoculated from each case. Either of the following media may be used:—Sabouraud's maltose agar: maltose 4 gm., peptone (Chassaing) 1 gm., agar 2·5 gm., distilled water 100 cc. Whey agar: whey 250 cc., peptone 5 gm., saccharose 7·5 gm., urea 3 gm., agar 2·5 gm., distilled water 250 cc., pH 7·4. These media may be obtained from the Calcutta School of Tropical Medecine. A few grains should also be sent in saline for direct examination. Tissues for sections should be fixed in 5 per cent. formalin in normal saline, and the pieces should not, if possible, be more than 4–5 mm. thick.

P. Tate.

Jeanselme, Huet (L.) & Lotte. Nouveau type de mycétome à grains noirs, dû à une torula encore non décrite. [**A New Type of Mycetoma with Black Grains Due to a Hitherto Undescribed Torula.**]—*Bull. Soc. Française Dermat. et Syph.* 1928. May. No. 5. pp. 369–375. With 3 figs. [4 refs.]

This case was observed in the Saint Louis Hospital, Paris. The subject was a woman aged 49 who had always lived in Martinique until she came to France 6 years before her admission to hospital.

Three years after her arrival in France she noticed a swelling of her foot, which gradually increased in size, but was not painful and did not incapacitate her. On her entry to the hospital, the tumour appeared as a blackish-brown mass involving the dorsal surface of the anterior-interior part of the right foot. The consistency was elastic and firm, and the mass was moveable on the underlying tissues, but the skin was not moveable on the tumour. A number of palpable elevations appeared on the surface. A roundish hard mobile mass about the size of a nut was present on the inner face of the calf of the leg. Radiology showed that the skeleton and tendons were not invaded.

Puncture of the elevations resulted in the issue of bloody pus containing small black grains about the size of a pin's head. These grains gave cultures of a fungus after 5 days when inoculated on Sabouraud's medium.

A note by Langeron on the mycology of the fungus is appended. He describes the grains as black, very small—0·5–1 mm.—and of very soft consistency. They are formed of a kind of hollow cord curled into a mass, which gives them a very irregular surface as interstitial substance is absent. The cords are formed of very short hyphae and round or angular cells. Cultures from grains succeed readily at 20–22° C., and in 24 hours give colonies of black down with a greenish reflection. Pigment is not secreted into the medium, and neither sclerotia nor chlamydospores are formed. These characters are sufficient to distinguish it from all other mycetomas with black grains.

In culture the fungus forms septate, deeply coloured hyphae, generally arranged in coremia, and forming abundant blastospores. These characters allow it to be placed in the genus *Torula* Persoon *emend.* Saccardo following the terminology of Cifferri. Although many species of *Torula* have been described, the descriptions are too meagre to permit it to be identified with any of them and the name *Torula Jeanselmei* n.sp. is proposed for it.

P. Tate.

Smith (E. C.). **Mycetoma in Nigeria.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Aug. 22. Vol. 22. No. 2. pp. 157–160. With 8 figs. on 4 plates. [5 refs.] [Med. Research Inst., Lagos, Nigeria.]

Three cases of mycetoma occurring in Nigeria are reported. Two involved the foot and one the forearm, and two of the subjects were women. Numerous bright red grains were present, and from them cultures of an *Actinomyces* were obtained. The parasite appears to be the same in all three cases, and is identified as *Aspergillus pelletieri* (Laveran 1906) [*Actinomyces pelletieri* (Laveran 1906)].

Inoculation of monkeys, rabbits and guineapigs with grains, and inoculation of rabbits and guineapigs with culture suspensions, were negative.

P. Tate.

Voizard (F.) & Leroy (D.). Un cas de pied de Madura traité avec succès par des injections intraveineuses de lugol. [**Case of Madura Foot treated successfully with Lugol.**]—*Bull. Soc. Path. Exot.* 1928. July 11. Vol. 21. No. 7. pp. 511–515. [4 refs.]

Case report concerning a native soldier from Madagascar, resident two years in France, from whose lesions on the right foot the *Madurella mycetomi*

(Laveran) was isolated by culture. Healing was effected by 18 intravenous injections (Feb. 5th–April 23rd.) of lugol solution, the dosage commencing with 1 cc. and rising to 10 cc. solution with an equal amount of distilled water.

W. J. O.

PALMER (F. J.). **A Second Case of Madura Foot treated by Chemotherapy with Apparent Cure.**—*Indian Med. Gaz.* 1928. Sept. Vol. 63. No. 9. pp. 530–531. With 2 text figs.

Case report to illustrate the efficacy of chemotherapy. The oral administration of zinc and copper citrate produced definite amelioration; apparent cure, with no recrudescence after 7 months, was attained by 6 intravenous injections of bismuth tartrate gr. 2–3½ given over a period of 6 weeks.

W. J. O.

RAO (M. G. Ramachandra). **A Case of Mycetoma of the Hand and Foot.**—*Indian Med. Gaz.* 1928. June. Vol. 63. No. 6. pp. 329–330. With 1 text fig.

Brief clinical report of a male native, aged 30 years, with mycetoma of the right hand and left foot of 2 years' and 6 months' duration respectively. [No bacteriological record is given.]

W. J. O.

TAKABASHI (Shinkichi). [**On Exanthema of the Axilla by Trichomycosis palmelina. A Contribution to the Knowledge of the Causative Agent of Trichomycosis palmelina Pick.**]—*Hifuka-Hitsunyokika Zasshi (Jl. Dermat. & Urol.).* 1928. Jan. Vol. 28. No. 1. [Summarized in *Japan Med. World.* 1928. May 15. Vol 8. No. 5. p. 128.]

From a study of the pathological histology of Trichomycosis palmelina, the author concludes that not only the shaft, but also the root, of the hair is infected; and that the fungus, of which he isolated five cultures, is an *Actinomyces*.

P. Tate.

SEQUEIRA (J. H.). **Prickly Heat and the Seborrhoides.**—*Kenya & East African Med. Jl.* 1928. Sept. Vol. 5. No. 6. pp. 207–210. [2 refs.]

In this review attention is drawn to the similarity of the morphological features of the fungus described by SMITH (this *Bulletin*, Vol. 24, p. 447) to those of the *Pityrosporon malassezia*. It is noted that the initial lesion experimentally produced by the former organism is a vesicle and by the latter a papule, while both types of skin eruption are beneficially treated by antiseptics.

W. J. O.

VON BASSEWITZ (E.). Die südbrasilianische Aroeirakrankheit (Dermatitis venenata phytogenes). [**Aroeira Disease of Southern Brazil, a Dermatitis Venenata.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Oct. Vol. 32. No. 10. pp. 494–500.

An account of the dermatitis occurring among predisposed persons coming in contact with the "aroeira" tree, which tree is difficult to

place in botanical classification. The toxic effects of the tree have for long been known to the natives, and have given rise to legendary tales among them. The causative factor of the dermatitis remains unestablished, the two older theories of an irritant from caterpillar larvae or from chrysophanic acid being proved to be no longer tenable. Certain meteorological conditions such as a barometric fall and a rise in atmospheric humidity appear to favour the occurrence of the disease, which is more frequent in the spring and among those individuals who show a hyperaemic and sweating skin. With a duration of 5–10 days the affection may be divided into the four stages of incubation, invasion, vesiculation and desquamation. Only rarely has a pustular stage been reported. Oedema of the affected parts may be extreme, especially of the face and of the male external genitals. The itching is intense, occurring in paroxymal attacks and accompanied by general symptoms of malaise with only occasional slight fever. Local paraesthesia in the areas involved is common and may persist for a time. Attempts to produce desensitization by non-specific protein injections have proved worthless. Injections of a distillate and of an alcohol-ethereal extract of the leaves produces a severe local reaction. Internal medication by homoeopathic doses of the same tincture has given gratifying results as far as the short period of 10 months allowed a verdict. Both clinically and etiologically the condition belongs to the large group of Anacardiaceous dermatoses, with which it has many points in common.

W. J. O.

DI LULLO (O.). Le "paaj," dermite provoquée par le quebracho rouge (*Schinopsis lorentzii*). [**Paaj, a Dermatitis provoked by the Red Quebracho.**]—*C. R. Soc. Biol.* 1928. Oct. 5. Vol. 99. No. 27. pp. 1000–1001.

Brief account from Santiago of a dermatitis, with intense local pruritus and associated with general symptoms, occurring among persons sensitive to the red "quebracho" tree (N.O. Anacardiaceae). The affection lasts for 5 to 10 days without producing any apparent immunization. A benign attack could be produced in the case of such individuals by friction with an alcoholic extract and water distillate of the leaves, the more intense reaction being induced by the alcoholic tincture.

W. J. O.

MCCULLOCH (W. E.). **Ulcers in Northern Nigeria—a Review and a Theory.**—*West African Med. Jl.* Lagos. 1928. July. Vol. 2. No. 1. p. 96 & pp. 101–102; 104–106. [6 refs.]

This interesting and suggestive communication should be read in its entirety as it hardly lends itself to abstraction. Secondary infection plays a very large part in the majority of tropical ulcers, whatever may have been the initial pathogenic factor. Some 18 primary lesions are briefly mentioned and described. Concerning acute suppurative mastitis, it is suggested that the *Staplylococcus tetragenus* may be the cause in some instances of elephantiasis of the breast and arms. "Absence of resistance, with low virulence of the infective organisms

are the only conditions which fit the tropical ulcer." Biochemical investigations showed in natives (1) a high blood-sugar without glycosuria, (2) a high deficiency of blood and sputum calcium, (3) a low blood-urea content with a very low urinary urea content. "Therefore tropical ulcer is conditioned by: (1) A chronic semi-starvation of the vast majority of the population. (2) The entrance of any mildly pathogenic organism. Tropical ulcer is a dietetic ulcer, and the question of causative organisms need not be considered at all." Such premises suggest a rational line of treatment which is shortly described.

W. J. O.

DALRYMPLE (J.) **Tropical Ulcer and Dietary.** [Correspondence.]—*West African Med. Jl.* Lagos. 1928. Oct. Vol. 2. No. 2. p. 133. [1 ref.]

This letter, written in support of McCulloch's contention of the dietary deficiency of natives being a main factor in the aetiology of "tropical ulcer," recounts the diminution in the occurrence of the affection among underground miners on the Gold Coast following the provision of "an improved and varied scale of diet with its vegetable adjunct." It is recorded also that the use of the bathing facilities provided was urged upon the native workers.

W. J. O.

RODHAIN (J.). Note au sujet d'une dermo-épidermite papuleuse épidémique du Bas-Congo. [**An Epidemic Papular Dermo-epidermosis in Lower Congo.**]—*Bull. Soc. Path. Exot.* 1928. May 9. Vol. 21. No. 5. pp. 383–386. With 1 text fig. [School of Trop. Med., Brussels.]

Description of an apparently new dermatosis occurring chiefly on the instep or dorsal surface of the foot and consisting of a well defined raised papule on an infiltrated base, with a central vesicle leading to superficial ulceration, surrounded by an erysipelatous zone of varying extent. The evolution of the lesion is completed in about 14 days, may be accompanied by fever and in the case of Europeans by a local or generalized roseolar eruption, while the glands draining the area are enlarged but do not suppurate. Observed mainly during the moist warm months, March and April, the sites affected suggest inoculation of the virus through insect bites. Most often there is only one single papule, and in the case of the natives this is situated on the uncovered parts such as the scalp. No bacilli have been detected in the pus from unopened lesions; cultures from the same were indefinite. Inoculation experiments reproduced similar lesions in 3 monkeys. Histological examination shows a thickening and necrosis of the stratum Malpighii, an infiltration of the papillae, true skin and hypoderma consisting of mononuclear and eosinophile cells. The necrosis only rarely extends into the true skin. While probably of streptococcal origin the infecting agent has yet to be determined. By its clinical evolution and histological picture the condition is to be differentiated from CASTELLANI'S tropical echthyma. The designation Bouton de Boma is put forward.

W. J. O.

Noel (P.). Le lupus érythémateux dans les races noires. [**Lupus erythematosus in the Black Races.**]—*Ann. Dermat. et Syph.* 1928. May. 6 Ser. Vol. 9. No. 5. pp. 372–377. With 1 fig. [7 refs.]

Interesting case report from Pondicherry of a Hindu woman, aged 30 years, with the affection of 6 months' duration on the face, scalp and limbs. The lesions consisted of depigmented plaques with atrophy and scarring of the skin, the surface covered with thick horny scales showing horny follicular plugs on removal. The condition was extensively distributed in butterfly pattern over the nose and cheeks, on the supraorbital regions, scalp and extensor aspects of the upper limbs. Both lips showed white spots. On the feet the lesions of only 3 months' duration consisted of achromic macules without any hyperkeratosis or atrophy. No adenopathy, no abnormal physical signs in the lungs. According to her own statement the patient's husband, now dead, had had similar lesions prior to marriage. Comment is made on the rare occurrence of the disease among the coloured races, which fact does not allow the description of any peculiarities of the affection in the few cases reported.

W. J. O.

Ramos e Silva (J.). A questão do lupus erythematoso entre os negros. Contribuição para uma "Dermatologia ethnica," a proposito de um artigo de P. Noel. [**Lupus Erythematosus in Negroes.**]—*Brasil-Medico.* 1928. Sept. 1. Vol. 42. No. 35. pp. 983–985. With 4 text figs.

In response to the hope expressed in Noel's article that others would record similar cases, the authors looked over the returns of the Dermatological Clinic in Rio de Janeiro and confirm the rarity of lupus erythematosus in negroes. Among 17,950 patients there were 67 suffering from this disease, and of these only three were negroes and 12 mulattos. Brief notes are given of one negro (male) and 2 mulattos (both females). The first suffered from syphilis also. The face lesions had persisted for 16 years, and at the Clinic were being treated with carbonic acid snow. The second presented typical lesions on the face, and in addition a large patch involved half the scalp. The disease began 8 years previously and got worse in spite of treatment by ultra-violet rays, carbonic snow, tuberculin, chaulmoogra, etc. Subsequently, intravenous injections of krysolgan and triphal have led to some improvement. The third case presented a circinate infiltration thought at one time to be leprotic. Nothing further is mentioned about this patient.

H. Harold Scott.

Dionisio Gutierrez (Perpetuo) & Hizon (Jose). **Mongolian Blue Spots among Filipinos.**—*Jl. Philippine Islands Med. Assoc.* 1928. Sept. Vol. 8. No. 9. pp. 380–383. [6 refs.] [College of Med., Univ. of the Philippines.]

The greater part of this interesting communication comprises an attempt to trace the Mongolian ancestry of the Filipinos. "It may be inferred that the forefathers of the Filipinos came from Sumatra, Borneo or Johore." Among 346 babies examined, 291 (84·10 per

cent.) showed blue spots. After the age of 5 years they were seldom found. Concerning the site 74 per cent. were observed over the sacrum, 10·96 per cent. in the lumbosacral region or waist and 10 per cent. about the lumbar region. A single spot was the rule; multiple spots were found in over 13 per cent. of the cases examined.

W. J. O.

STRONG (W. M.). **The Treatment of Scabies.** [Correspondence.]—*Med. Jl. Australia.* 1928. May 19. 15th Year. Vol. 1. No. 20. p. 631.

A case of "Kunikuhi," a disease probably identical with scabies, involving all the body, cleared up completely a week after 3 grains bismuth tartrate had been given intramuscularly.

A. G. B.

PANAYOTATOU (Angelica). A Case of Very Extensive Leucodermia.—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. June 30. Vol. 22. No 1. p 89. With 1 fig.

RELAPSING FEVER AND OTHER SPIROCHAETOSES.

Plaut (F.). Das Nervensystem als Bildungsstätte für Antikörper bei Rekurrens. [**The Nervous System as the Site for the Formation of Antibodies in Relapsing Fever.**]—*Wien. Klin. Woch.* 1928. July 12. Vol. 41. No. 28. pp. 1005–1009. With 2 text figs. [13 refs.] [German Research Inst. for Psychiatry, "Kaiser Wilhelm" Inst., Munich.]

The results of a study of two patients infected with relapsing fever showed that in both cases antibodies were present in the serum and cerebro-spinal fluid. Weekly examinations were made of these two fluids and it is seen that the antibody formation starts earlier, attains a greater intensity and lasts longer in the serum than in the cerebro-spinal fluid. The author's observations indicate, however, that the invasion of the nervous system by spirochaetes is followed by the formation of specific antibodies, as shown by their appearance in the cerebro-spinal fluid. In view of the theory that immune bodies are built up by the reticulo-endothelial system, it will be of interest to determine which part of the brain is concerned in the formation of the immune bodies against relapsing fever spirochaetes.

E. Hindle.

Rosenholz (H. P.), Owsjannikowa (O. W.) & Trefilow (I. A.). Ueber die "neurotropischen" Eigenschäften der Rückfallfieber-spirochäten und die Therapie der Neurospirillosen. [**On the Neurotropic Properties of Relapsing Fever Spirochaetes and the Treatment of Brain Infections.**]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 4. German summary p. 280. [In Russian pp. 249–259. 39 refs.]

The authors have studied this property in *S. recurrentis* and *S. duttoni* (Frankfurt strain) and find that the neurotropism shown by these organisms depends primarily on the possibility of their being able to enter the nervous tissue, and secondly on being able to live in a kind of symbiotic relation with this tissue. ["Neurobiose."]

The neurotropic property is not directly correlated with the virulence of the organism. By passing a needle into the brain of a mouse and then inoculating the animal in the ordinary way with either *S. recurrentis* or *duttoni*, infection of the nervous system was invariably obtained. Such animals could not be sterilized by injections of any salvarsan preparations.

In trying to obtain more efficient therapeutic agents, it is recommended that compounds should be tested on brain infections in mice, easily produced in the manner indicated above, which at present do not respond to any known treatment.

E. H.

Kroó (H.). Schlussbemerkungen zu einigen Arbeiten über experimentelle Rekurrens. [**Experimental Relapsing Fever. Controversial.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1928. Apr. 30. Vol. 108. No. 3. pp. 617–620. [17 refs.] ["Robert Koch" Inst., Berlin.]

Prigge (R.) & Rothermundt (M.). Entgegnung auf die vorstehenden Bemerkungen von Dr. Kroó.—*Ibid.* pp. 621–626. [15 refs.] [State Inst. of Experim. Therap., & "Georg-Speyer" House, Frankfurt a.M.]

Polemical articles on the persistence of relapsing fever spirochaetes in the brain and its bearing on chemotherapy and general questions of immunity. It is unnecessary to give details of these arguments, which are mainly repetitions of views that have already appeared in this *Bulletin.*

The extent to which brain infection develops in animals infected with blood spirochaetes, whether a widespread phenomenon, as suggested by Kroó, or rather exceptional as stated by Prigge and Rothermundt; whether brain infections can withstand chemotherapeutic agents or not; whether results obtained with relapsing fever are applicable to syphilis or not; and questions of immunity in spirochaetosis are discussed with considerable acrimony. [In the opinion of the reviewer Kroó has the better of the argument.]

E. H.

Markoff (Wl.). Hautexanthem bei Rückfallfieber. [**Exanthem in Relapsing Fever.**]—*Seuchenbekämpfung.* 1928. Vol. 5. No. 3. pp. 166–169.

The author studied the features of this disease in a large epidemic amongst the Bulgarian troops at Gallipoli during the Balkan War and, later, a second epidemic in north-eastern Bulgaria. In both cases a large proportion of the patients showed haemorrhagic exanthemata, and evidence is adduced in support of the view that these symptoms are not the result of a mixed infection, as suggested by Babes and others, but entirely the result of this type of relapsing fever.

A careful bacteriological study was made of a number of patients showing these symptoms, including the author himself; the Weil-Felix and Widal reactions were negative, as well as cultures and thick drop examination for malaria.

The exanthem generally appeared during the first attack, and took the form of intense red spots which were not affected by pressure. They were especially frequent on the arms and legs, then on the chest, but only rarely on the back. After becoming about the size of a pea and purple red in colour, they disappeared in three or four days.

The symptoms of relapsing fever were found to depend mainly on the virulence of the particular strain of *S. recurrentis*, and secondarily on individual disposition. When the exanthem was present it appeared earliest in the severe cases, but often only two or three haemorrhagic spots could be seen, which later developed into the characteristic exanthem.

E. H.

Bergsma (Stuart). **Relapsing Fever in Abyssinia.**—*Jl. Trop. Med. & Hyg.* 1928. Nov. 15. Vol. 31. No. 22. pp. 289–290.

An account of cases of relapsing fever, twelve of which occurred in one hut. As a general rule the injection of 0·6 to 0·75 gm. of neosalvarsan or novarsenobenzol prevented any relapses and the patients

made an uninterrupted recovery. In two cases complications were observed; one patient had jaundice for five days, accompanied by hiccough, and another, a two year old child, had a parotid abscess and sloughs on the buttocks and thighs. Both *Ornithodorus moubata* and *O. savignyi* occur in Abyssinia and the housing conditions are such as to favour the rapid spread of this disease.

E. H.

Ruge (Heinrich). Ueber zwei Fälle von Rückfallfieber mit einigen biologischen Besonderheiten. [**Two Cases of Relapsing Fever with Biological Peculiarities.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. June. Vol. 32. No. 6. pp. 316–320. With 2 charts in text. [Inst. for Ship & Trop. Diseases, Hamburg.]

A record of two cases of Moroccan relapsing fever, one acquired in nature and the other a laboratory infection of the author himself, after the strain had been passed through eight mice. In both cases facial paralysis of the right side developed between the third and fourth relapses, thus confirming the views of earlier observers, that this strain of relapsing fever often produces lesions of the peripheral nerves. In the second case the infection caused the reappearance of an abscess in the middle ear, which had been affected about ten years previously. The administration of a total of 14·50 gm. of stovarsol failed to prevent the occurrence of four relapses. In this connexion the author remarks that six years previously 0·3 gm. produced a marked exanthem, whilst on this subsequent occasion no ill effects were observed.

E. H.

Ruge (Heinrich). Einige Bemerkungen zur Behandlung des Rückfallfiebers mit Spirozid. [**Treatment of Relapsing Fever with Stovarsol.**] —*Dermat. Woch.* 1928. Sept. 15. Vol. 87. No. 37. pp. 1302–1304. With 1 chart. [3 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

The author calls attention to the treatment of relapsing fever in himself [see above] in which 14·50 gm. of stovarsol, equivalent to about 6 gm. of neosalvarsan, were administered without destroying all the spirochaetes. As a result the use of this substance as a prophylactic agent against syphilis seems to be of doubtful value.

E. H.

Bruynoghe (R.) & Dubois (A.). Immunité et diversité des souches dans l'infection expérimentale à *Spirochaeta duttoni*. [**Immunity and Diversity of Strains in Experimental Infections with** *S. duttoni*.] —*C. R. Soc. Biol.* 1928. May 4. Vol. 98. No. 14. pp. 1247–1248. [2 refs.]

The authors find that in mice recovered from infection with *S. duttoni*, the resulting immunity lasts at least six months and is probably of long duration. It is necessary, however, to employ the same strain of spirochaetes to test this immunity, and the diverse opinions on this subject are probably the result of using strains which were not strictly homologous.

E. H.

Nicolle (Charles) & Anderson (Charles). Présence au Maroc du spirochète de la fièvre récurrente d'Espagne. [**The Presence in Morocco of the Spirochaete of Spanish Relapsing Fever.**]—*Arch. Inst. Pasteur de Tunis.* 1928. June. Vol. 17. No. 2. pp. 83–107. With 1 text fig. & 2 charts in text. [1 ref.]

This paper is an extension with experimental details of that reviewed in this *Bulletin*, Vol. 25, p. 586. The authors propose the name *Spirochaeta hispanicum* var. *marocanum* for the causative organism.

E. H.

Mathis (C.). Identité, à Dakar, du spirochète des rats, du spirochète de la musaraigne et du spirochète récurrent humain. [**The Identity, at Dakar, of the Spirochaetes from Rats, Shrew Mice and Cases of Human Relapsing Fever.**]—*Bull. Soc. Path. Exot.* 1928. June 13. Vol. 21. No. 6. pp. 472–485. With 2 text figs. [24 refs.] [Pasteur Inst., Dakar, French West Africa.]

——. Identité du spirochète de la fièvre des tiques (*Sp. duttoni*) et des diverses souches de spirochètes récurrents dakarois. [**The Identity of the Spirochaete of Tick Fever** (*Sp. duttoni*) **and the Various Dakar Strains of Relapsing Fever Spirochaetes.**]—*Ibid.* July 11. No. 7. pp. 585–593. [3 refs.] [Pasteur Inst., Dakar.]

After numerous publications on this subject, accompanied by voluminous tables giving the results of cross immunity experiments, the author has changed his views as to the distinctness of the Dakar strains of spirochaetes and now agrees with Nicolle and Anderson that they are identical with *S. duttoni*. Consequently *Spirochaeta crocidurae* becomes a synonym of that species.

E. H.

Iwanowa (D. A.). Ein Fall von Laboratoriumsinfektion mit Rückfallfieber durch die Conjunctiva. [**A Case of Laboratory Infection with Relapsing Fever through the Conjunctiva.**]—*Klin. Woch.* 1928. Sept. 9. Vol. 7. No. 37. pp. 1742–1743. [13 refs.]

The record of a laboratory worker who accidentally received in his eye a drop of a culture of spirochaetes, and eight days later developed an attack of relapsing fever.

E. H.

Gray (J. D. Allan). **Accidental Infection with** *Treponema duttoni*.—*Ann. Trop. Med. & Parasit.* 1928. Nov. 9. Vol. 22. No. 3. pp. 273–289. With 1 fig. [57 refs.] [Bact. Dept., Univ., Edinburgh.]

A lengthy and detailed account of a laboratory infection with tick fever. The data suggest that the author was infected on two occasions, first probably from blood containing spirochaetes getting on to his fingers and secondly from the bite of an infected mouse. Eight pyrexial attacks were experienced and two abortive ones. It is of

interest that the blood still contained spirochaetes, as shown by inoculation into mice, 32 days after the last rise of temperature. Treatment with novarsenobillon had no obvious effect on the course of the disease. The serum taken at various intervals after recovery failed to protect mice from infection and produced neither lysis nor agglutination in the spirochaetes of successive attacks in mice.

E. H.

MELENEY (Henry Edmund). **Relapse Phenomena of** *Spironema recurrentis.*—*Jl. Experim. Med.* 1928. July 1. Vol. 48. No. 1. pp. 65–82. With 1 chart & 1 text fig. [14 refs.] [Peking Union Med. College, Peking, China.]

The author found that the gray squirrel, *Sciurotamias davidianus*, and the striped chipmunk, *Eutamias asiaticus*, could both be infected with the Chinese strain of relapsing fever, but no relapses occurred in normal animals. After splenectomy, however, the intensity of the infection was increased and one or two relapses appeared.

The original strain of spirochaetes was transferred from one squirrel to another by inoculation of blood taken at the height of the first attack. When relapses occurred these were also transferred to separate series of animals, and in turn when these had relapses they were similarly treated. In this way six strains of spirochaetes were isolated which retained their specific agglutination characteristics as long as they were kept under observation.

The sequence of these strains in the relapses was not always the same; sometimes new ones were produced and at other times they reverted to an older strain. The related strains were always those which appeared, or might have appeared, in alternate attacks and only once did related strains appear in two consecutive attacks. Squirrels whose spleens had not been removed, and who consequently showed only one attack, developed immune bodies only against the strain inoculated or against closely related strains. In principle, the results agreed with the view that when Strain 1 is inoculated Strain 2 appears in the relapse, and when the latter is inoculated Strain 1 appears in the relapse [see CUNNINGHAM, this *Bulletin*, Vol. 23, p. 112], but with later strains there was a widening zone of antibody formation and it was found possible by reinoculation to infect squirrels with four different strains in succession.

The spleen has a protective influence against the development of relapses but does not control the formation of specific immune bodies.

Finally, the author points out that quite different immunological strains of *Spirochaeta recurrentis* can be isolated from human cases of Chinese relapsing fever occurring in the same locality, and he aptly remarks that at present there is no justification for the division of relapsing fever spirochaetes into different species.

[The relationship between the original and relapse strains of spirochaetes does not seem to consist of a simple alternation of two types as originally supposed, but is a much more complicated phenomenon. The author's results should be compared with those obtained by GORI, and by BRUSSIN and ROTOWA, *loc. cit.*, Vol. 25, pp. 588 and 589.]

E. H.

Nicolle (Charles) & Anderson (Charles). Un nouveau spirochète récurrent, pathogéne pour le cobaye, *Sp. sogdianum*, transmis par *Ornithodorus papillipes*. [**A New Relapsing Fever Spirochaete, *Sp. sogdianum*, Pathogenic for Guinea-Pigs, transmitted by *O. papillipes*.**]—*C. R. Acad. Sci.* 1928. Oct. 29. Vol. 187. No. 18. pp. 746–748.

With *Ornithodorus papillipes* received from Bokhara, Russian Turkestan, the authors have produced a spirochaetal infection in guineapigs which seems to differ in its properties from any previously described. As a rule the guineapig is not very susceptible to relapsing fever spirochaetes, but *S. sogdianum* is markedly pathogenic for this animal. When infected by the bites of infected ticks, there is an incubation period of 7 to 9 days followed by two to four febrile attacks, each terminating in a crisis. In each attack there is a gradually increasing number of spirochaetes until the crisis. A monkey (*Macacus cynomolgus*) was infected by blood inoculation, and showed three attacks, and spirochaetes were observed only in the first attack.

The virus can easily be maintained by passage through guineapigs, either by direct blood inoculation or the medium of ticks. Cross immunity experiments show that this spirochaete is distinct from *S. hispanicum*, and its Moroccan variety, also from *S. duttoni* and *S. normandi*.

In nature, transmission is by *Ornithodorus papillipes*, but *S. sogdianum* can also be transmitted by *O. moubata* and *O. normandi*.

An attempt to transmit the infection from one monkey to another by means of lice was negative.

E. H.

Nicolle (Charles), Anderson (Charles) & Colas-Belcour (Jacques). Premiers essais d'adaptation du spirochète des poules à divers Ornithodores. [**First Attempts to adapt Fowl Spirochaetes in Various Ornithodorus.**]—*C.R. Acad. Sci.* 1928. Nov. 5. Vol. 187. No. 19. pp. 791–792.

The authors fed *Ornithodorus moubata*, *O. marocanus* and *O. normandi* on fowls infected with spirochaetosis, and after a week's interval refed the ticks on normal fowls, with negative results. Emulsions of the contents of the ticks were then inoculated into fowls and it was found that the spirochaetes had survived in *O. marocanus* for at least 18 days, whilst in the other two species the virus had disappeared. Attempts to transmit the Spanish strain of relapsing fever by *Argas persicus*, gave negative results.

E. H.

Anderson (T. E.). Récupération de la virulence du *Spirochaeta gallinarum* par inoculation d'une émulsion d'*Argas persicus* à des poussins et à des embryons de poulets. [**Revival of Virulence of *Spirochaeta gallinarum* by the Inoculations of Emulsions of *Argas persicus* into Chickens and Fowl Embryoes.**]—*C.R. Soc. Biol.* 1928. July 6. Vol. 99. No. 23. pp. 378–379. [Pasteur Inst., Paris.]

The author found that after repeated passages through fowls a strain of *S. gallinarum* had completely lost its virulence for adult

birds, and, moreover, these could not be infected by *Argas persicus* that were infected with the same strain.

An emulsion of some of these ticks was inoculated into eggs that had been incubated for 15 days. After another 15 days the eggs hatched and in one of the chickens numerous spirochaetes were observed in the blood. The other two chicks died, but were negative.

Three chicks. 2 days old, were each inoculated with an emulsion of Argas, and all showed parasites on the 5th day. On the 6th day their blood was inoculated into 3 fowls, two of which became heavily infected, whilst the third remained negative.

E. H.

Nicolle (Pierre). Etude chimiothérapique de la spirochétose espagnole chez la souris. [**A Chemotherapeutic Study of Spanish Relapsing Fever in Mice.**]—*Arch. Inst. Pasteur de Tunis.* 1928. Sept. Vol. 17. No. 3. pp. 218–223.

The results show that this strain of relapsing fever resembles others in its resistance to organic arsenical compounds, requiring doses 20 to 50 times as great as those sufficient to cure *Trypanosoma brucei* infections. Doses of 0·004 to 0·005 gm. novarsenobenzol were found generally to effect a cure, but bismuth potassium tartrate and " No.309 Fourneau " were found to have no action on the spirochaetes. In view of the fact that this strain of relapsing fever has not been known to cause a fatal infection, it is recommended for therapeutic use where it is desired to employ spirochaetes.

E. H.

Schockaert (J.). Action thérapeutique de l'antimoine sur le *Spirochaeta duttoni*. [**The Therapeutic Action of Antimony on** *S. duttoni*.]—*C.R. Soc. Biol.* 1928. July 27. Vol. 99. No. 25. pp. 654–656. [5 refs.] [Bact. Lab., Univ., Louvain.]

Mice infected with *S. duttoni* were given doses of 0·0025 to 0·0035 gm. neosalvarsan per 20 gm. body weight, and in the great majority of cases showed relapses. Subsequently, the effect of various antimony compounds was tested and some interesting results obtained on the influence of chemical constitution on the therapeutic efficiency. For example, stibenyl was almost without action, whilst H 471, which only differs from it by the addition of a chlorine atom in the meta position, was almost as efficacious as neosalvarsan.

E. H.

Suzuki (Seiichi). Experimentelle Studie ueber Recurrensspirillen auf den Mäuse und den Ratten. I. Toxitaetsversuch und Heilversuch mit Sulfoxylsalvarsan. [**An Experimental Study of Relapsing Fever in Mice and Rats. Toxicity and Treatment with Sulphoxylsalvarsan.**]—*Jl. Oriental Med.* 1928. Apr. Vol. 8. No. 4. German summary p. 66. [In Japanese.] [Manchuria Med. College, Mukden.]

The maximum dose of this compound was found to be 1·0 cc. per 10 gm.; the curative dose 0·3 cc. per 10 gm., but 0·1 to 0·2 cc. caused

the disappearance of spirochaetes from the blood. Protection experiments gave negative results.

This compound is said to be less toxic and produce a more lasting effect than other salvarsan preparations.

E. H.

LAPIDARI (Mario) & SPARROW (Hélène). Sur la culture des spirochètes des fièvres récurrentes. [**The Culture of Relapsing Fever Spirochaetes.**]—*Arch. Inst. Pasteur de Tunis.* 1928. Sept. Vol. 17. No. 3. pp. 191–205. With 13 figs.

The authors very aptly remark that in spite of the lengthy publications on this subject, it is very difficult to find a good description of the best way of cultivating spirochaetes. Whichever method one adopts, unexpected failures are met with, even when the directions are carefully followed. After many experiments with various strains of relapsing fever spirochaetes they find that a modification of Ungermann and Galloway's method, described by BRUYNOGHE [this *Bulletin*, Vol. 25, p. 595], gives the best results. As a general rule, the conditions necessary for the successful cultivation of these organisms are as follows :—

(1) Anaerobiosis, obtained in the presence of coagulated albumen, such as egg white, serum, organs, in long narrow tubes, the surface of the medium being covered by oil or vaseline.

(2) A medium containing albumens obtained by the addition of the fresh serum of the rabbit or horse, diluted with saline.

(3) The presence of blood, or pieces of fresh organs, or embryonic tissues.

(4) The pH value is also of vital importance, and must be adjusted to the optimum for the organism being cultivated.

The authors found that if in Ungermann's medium, Ringer's solution was replaced by Hartley's broth, very much better growth of the spirochaetes was obtained, and this method was the one generally employed. It is advisable to make subcultures during the first week, since if made towards the end of their growth, the cultures remain negative for long periods, and gradually take longer to develop. Curves are given illustrating the growth of a number of cultures and the results obtained by making subcultures at different intervals from the beginning of the original culture. In some cases the cultures showed relapses, in one series the spirochaetes being numerous about the fifth and seventh days, and then completely negative, the organisms reappearing after the 16th day and attaining their maxima from the 20th to the 33rd day, and disappearing finally between the 37th and 45th days. The results of these experiments support the view that the relapse phenomenon in spirochaetosis is not caused by a reaction of the host, but depends upon some specific property of the organism itself.

E. H.

CARROSSE (J. A. B. B. J.). Chronique des bronchospirochaetoses, à propos d'une épidémie. [**A Record of Bronchospirochaetosis, in Connexion with an Epidemic.**]—*Arch. Méd. et Pharm. Milit.* 1928. Aug. Vol. 89. No. 2. pp. 201–207.

During 1927 the author observed 50 cases of this infection in Morocco and as a result of his observations inclines to the view that it is caused by invasion of the bronchi by Vincent's spirochaete.

Six cases of Vincent's angina without any bronchial symptoms were observed, and in addition the following clinical types, in which the spirochaetes were found in the sputum.

(1) 6 cases of pneumonic, or broncho-pneumonic forms, closely resembling influenza.

(2) 39 cases of bronchitis associated with the presence of fusiform spirochaetes.

(3) 5 cases of bronchitis with bloody sputum, following typical Vincent's angina.

The examination of 14 Indo-Chinese hospital attendants showed the presence of 8 carriers of fusiform spirochaetes in the mouth. Out of 14 Arabs and Berbers only 2 were carriers and 14 Europeans showed only one carrier. All the patients were treated by stovarsol, 1 gm. per day for 20 days, and adrenalin, 30 drops of a 1 : 1000 solution, for 10 days. The pneumonic forms were also treated by repeated injections of 0·15 gm. novarsenobillon.

All attempts to cultivate the spirochaetes were negative.

E. H.

Raimondi (Silvio) & Canal Feijóo (Enrique J.). Espiroquetosis del aparato respiratorio. [**Spirochaetosis of the Respiratory Tract.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1928. Vol. 4. Nos. 28–31. pp. 384–393. [Also issued as *4a Reunión Soc. Argentina Patol. Regional del Norte Santiago del Estero 7, 8 y 9 Mayo 1928.* pp. 384–393.]

Respiratory spirochaetosis appears to be common in Santiago del Estero. The authors have seen 27 cases within 5 months and they give brief details of eleven.

Among 287 patients seen at the Dispensary between Dec. 1st, 1927, and April 24th, 1928, there were 9·27 per cent. having this condition. The proportion to cases of tuberculosis was 1·6 : 1, " not counting in any cases of tuberculosis harbouring spirochaetes." Of the 27 specially referred to 19 were females. The main symptoms were cough, sometimes (not always) with expectoration, pain in the chest, troublesome but not acute, profuse nocturnal sweats, not much loss of weight, usually 2–3 kilos in 8 months, but in one instance 8 kilos. Blood is often present in the sputum, but never abundant. The " physical signs are trivial " and there is no rise of temperature. The characters of the sputum are " its opacity, early lysis of any blood present, and early decomposition."

Stovarsol results usually in disappearance of the organisms and the symptoms. The authors conclude that all patients with pulmonary complaints should be examined for this condition, that it is endemic in Santiago del Estero, that *formes frustes* are common, and that the disparity between subjective and objective signs should indicate examination of the sputum for the spirochaetes. [With so indefinite a condition, the question naturally arises, Is this a morbid entity at all ? Secondly, why is no experimental work undertaken to prove or disprove the pathogenicity of these abundant spirochaetes ?]

H. Harold Scott.

Wofcy (Isaac). Dos casos de bronquioespiroquetosis de Castellani. [**Two Cases of Bronchial Spirochaetosis.**]—*Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1928. Vol. 4. Nos. 28–31. pp. 394–399. With 2 text figs. [Also issued as *4a Reunión Soc. Argentina Patol. Regional del Norte Santiago del Estero 7, 8 y 9 Mayo 1928.* pp. 394–399. With 2 text figs.]

The first patient was a man of 31 years. His illness began in 1920 with pain in the right shoulder and yellowish, loose expectoration. No tubercle bacilli were found. In 1926 the sputum contained blood for the first time and in July 1927 there was free haemoptysis. There was no fever and the physical signs in the thorax revealed no disease. Spirochaetes were abundant in the sputum, but cleared up on administration of neosalvarsan intravenously, three courses each totalling 3·9 mg., with stovarsol by mouth in the intervals. The second case was very similar, except that the disease started with coryza three years previously. Cure was effected by the same treatment.

The author states that fusiform bacilli are often associated and he discusses the question whether Castellani's bronchial spirochaetosis may or may not be due to aspiration from a Vincent's angina, but " in none of the cases observed up to the present has Vincent's angina been seen in these patients, and vice versa Vincent's angina, though common in the district, is not complicated by pulmonary lesions." The condition, he concludes, is by no means rare ; though it may be mistaken for tuberculosis the maintenance of general health, the presence of spirochaetes, absence of tubercle bacilli, and ready curability with arsenical preparations, make the distinction between the two easy.

H. Harold Scott.

Cool (P.). Broncho-spirochaetosis van Castellani in de Molukken. [**Bronchospirochaetosis in the Moluccas.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1928. Vol. 68. No. 2. pp. 293–296.

After the case described by Schijveschuurder in 1925 (see this *Bulletin*, Vol. 23, p. 116) no further cases were seen till 1927 when eight cases came to the author's notice between March and August. No certainty could be obtained as to where the infection was acquired, but reports from the interior of Ceram render it very probable that the disease is endemic in the Moluccas. It has generally a benign character, and notwithstanding repeated lung bleedings the general condition of the patients remains good. The author's attempts to treat the disease with iodate of potash, arsphenamine or tartar emetic yielded only temporary results.

W. J. Bais.

Poldie (H.). Observations sur la spirochétose bronchiale. [**Observations on Bronchial Spirochaetosis.**]—*Bull. Soc. Path. Exot.* 1928. Oct. 10. Vol. 21. No. 8. pp. 620–625. [" Hadassa " Med. Centre, Tiberias, Palestine.]

The description of a case of this disease in a Jew from Tiberias, Palestine, followed by a general discussion of the subject. The author comes to the conclusion that bronchial spirochaetosis is a definite clinical syndrome, probably caused by the invasion and multiplication of the spirochaetes from the mouth and pharynx in the trachea and bronchii. The infection develops only after the mucous membranes of the bronchial tubes have been rendered susceptible by another infection, or by modifications of the tissues as a result of alterations in the circulation, in the general metabolism, or in local immunity.

E. H.

DE MELLO (Froilano) & FIALHO (António). Sur les spirochètes commensaux des arcades dentaires et de l'intestin de l'homme et de quelques animaux domestiques. [**The Commensal Spirochaetes of the Human Teeth and Intestine, and of Some Domestic Animals.**] —*Arquivos da Escola Méd.-Cirurg. de Nova Goa.* 1928. Ser. A. No. 2. pp. 69–85. [10 refs.] [Bact. Inst., Nova Goa.]

The authors give statistics of the prevalence of mouth spirochaetes in Portuguese India. Persons infected with pyorrhoea alveolaris practically always show spirochaetes. An examination of normal mouths showed that the incidence increased with age, 20 per cent. in children of 3–12 years, 56 per cent. in young men of 12–21 years, and in adults 80 per cent. The author has studied these organisms in Angola as well as India and gives the dimensions and indices of the four types of spirochaetes identified by him, viz., *S. buccalis*, *S. dentium*, *S. intermedia*, and *S. buccalis* var. In India *S. buccalis* and *S. dentium* are very abundant, but *S. intermedia* is rare and the fine variety of *S. buccalis* has never been found. In Angola, on the other hand, all four species are present.

The examination of the mouths of various animals showed the presence of similar types. The horse contained four types, corresponding to those found in man, and the pig three, corresponding to *S. buccalis*, *S. dentium* and *S. intermedia*. Cattle showed only two types, *S. buccalis* and *dentium*, but the dog, like the horse, contained four types. Rats, mice, goats and sheep were examined with negative results.

With regard to the spirochaetes of the human intestine, four types have been observed, *S. macfiei*, *S. couceiri*, *S. eurygyrata* and *S. intestinalis*. The latter species is considered to be probably the same as *S. intermedia* of the mouth. An examination of a number of normal persons and others suffering from various intestinal diseases, leaves no doubt that these spirochaetes are harmless commensals, of no pathological significance.

Spirochaetes of the type *eurygyrata* were found in the intestines of the following animals: horse, mule, sheep, pig, cattle, dog, goat, rabbit, guineapig and cat. The mouse contained two types, one resembling *eurygyrata*, and in one example of *Mus rattus* a very small fine spirochaete was observed.

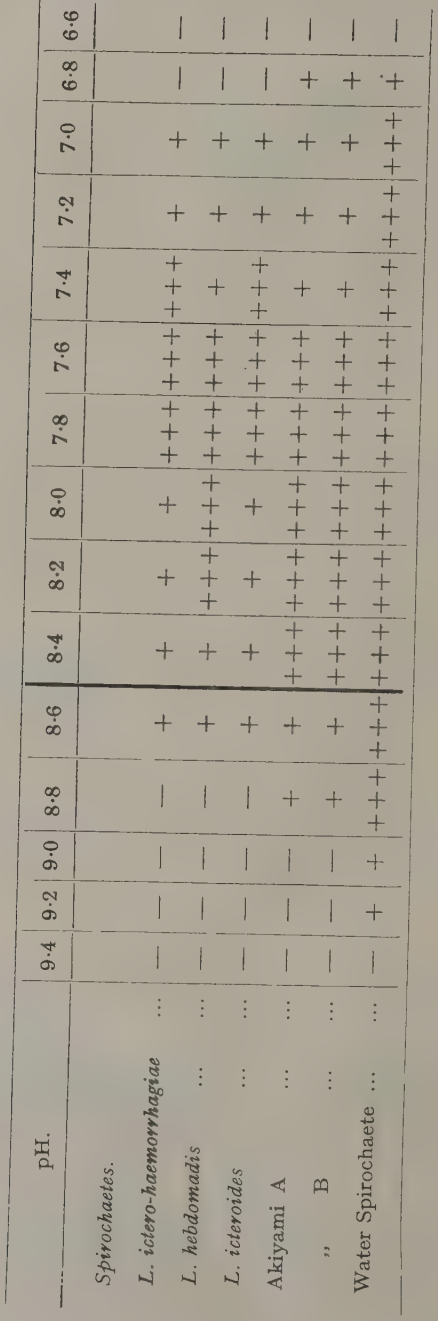
E. H.

i. FUKUSHIMA (Banji). Ueber die Nährböden für die Spirochaeten. Ueber die Entwicklung von *Spirochaeta icterohaemorrhagiae* und ähnlichen Spirochaeta, sowie ueber das Optimum der Wasserstoffionenkonzentration für Dieselben. II. Mitteilung. [**Culture Media for Spirochaetes. The Development of** *Sp. icterohaemorrhagiae* **and Similar Spirochaetes, also the Optimum Hydrogen Ion Concentration for their Growth. Part 2.**—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1927. Vol. 6. pp. 533–544.

ii. ——. Ueber Kulturverfahren der *Spirochaeta icterohaemorrhagiae* und ähnlicher Spirochaeten. III. Mitteilung. [**Methods of cultivating** *Sp. icterohaemorrhagiae* **and Related Spirochaetes. Part 3.** —*Ibid.* pp. 545–554. With 1 plate. [28 refs.]

i. The first paper contains the results of altering the pH concentration in a culture medium consisting of 500 cc. distilled water mixed with

10 cc. of inactivated horse serum and then cultivating various strains of *Leptospira*. The results are given in the following table :—



pH.	9·4	9·2	9·0	8·8	8·6	8·4	8·2	8·0	7·8	7·6	7·4	7·2	7·0	6·8	6·6
Spirochaetes.															
L. ictero-haemorrhagiae ...	−	−	−	−	+	+	+	+	+	+	+	+	+	−	−
L. hebdomadis ...	−	−	−	−	+	+	+	+	+	+	+	+	+	−	−
L. icteroides ...	−	−	−	−	+	+	+	+	+	+	+	+	+	−	−
Akiyami A ...	−	−	−	+	+	+	+	+	+	+	+	+	+	+	−
,, B ...	−	−	−	+	+	+	+	+	+	+	+	+	+	+	−
Water Spirochaete ...	−	+	+	+	+	+	+	+	+	+	+	+	+	+	−

ii. In the second paper the author recommends the two following media for the culture of *Leptospira*.

(1)	Citric acid ...	0·1
	Calcium chlorate ...	0·1
	Sodium hydrate ...	5·5
	Tap water ...	100·0 cc.

This mixture is sterilized for one hour at 100° C.; 0·3 gm. saccharose is then dissolved in a little distilled water, heated for 10 minutes to 100° C. and added to the above solution. 80 cc. of the resulting medium are then mixed with 20 cc. of inactivated horse serum, the resulting pH being 7·4 to 7·6; the mixture is then run into test-tubes, 10 cc. in each.

(2)	Citric acid ...	0·1
	Calcium chloride ...	0·1
	Sodium hydrate ...	5·5
	Glucose	0·2
	Tap water ...	100·0 cc.

After sterilization for one hour at 100° C., 80 cc. of this solution are mixed with 20 cc. of inactivated horse serum and divided into test-tubes as in the case of the first medium.

The tubes containing the media are heated for one hour at 56° C. and then one drop of infected guineapig blood is added to each tube; they are then incubated at 37° C. for 48 hours. For making subcultures one drop of normal guineapig blood is added to each tube and then 0·1 cc. of the culture. For making plate cultures the first medium is used, but 75 cc. of the mixture is mixed with 25 cc. of horse serum. After heating to 56° C. for one hour, one drop of normal guineapig blood is added to each tube, and these left for 24 hours for the fibrin to precipitate. The clear supernatant fluid is then poured on to agar plates (without bouillon or peptone) in the proportion of about 1 to 5. The culture of spirochaetes, preferably after two or three passages, is then sown on the surface of the plate, which is then grown for 4 days at 37° C. and afterwards at 30° C.

E. H.

Jakimow (W. Ph.). Zur Methodik der Rieckenberg-Brussinschen Reaktion. [**The Technique of the Rieckenberg-Brussin Reaction.**] —*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. Vol. 58. No. 5/6. pp. 413–422. [5 refs.] [People's Commissariat (A.T.S.S.R.) for Hygiene, & State Univ., Kasan.]

An account of the method of using this reaction for the identification of strains of relapsing fever. The author gives the following details: In order to strengthen the adhesive action of the immune bodies it is necessary to add a drop of the citrated blood of a normal animal. The immunization of rats and rabbits with killed cultures of *S. recurrentis*, results in the formation of an immune serum capable of producing the adhesion phenomenon, in the same way as serum from animals that have recovered from an infection. The immune plasma and serum from an animal infected with a relapse strain contains immune bodies not only against that strain, but also against the original strain. The thrombocytobarin on which this reaction depends can be produced by the passive immunization of normal animals.

E. H.

Regendanz (P.). Ueber die Bedeutung der Milz bei der Spirochäteninfektion. [**The Significance of the Spleen in Spirochaetal Infections.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. Nov. 7. Vol. 109. No. 5/6. pp. 321–327. [22 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Working with *S. didelphydis*, a spirochaete of a South American opossum, the author has investigated the effects of splenectomy. His results support the generally accepted views as to the protective value of the spleen, for out of 9 normal opossums infected with spirochaetosis only 2 died, after 12 and 15 days respectively, whilst 8 splenectomized animals, similarly infected, all died within 7 to 15 days, and also showed heavier infections. In addition, those animals infected with *Haemogregarina didelphydis* showed an increase in the multiplication of these parasites.

E. H.

Jausion (H.). Les spirochétoses. Généralités et spirochétoses ectomésodermiques. [**Spirochaetoses. Generalities and Ecto-Mesodermic Spirochaetoses.**]—*Paris. Méd.* 1928. Oct. 13. Vol. 18. No. 41. pp. 301–308.

A general account of spirochaetosis with special reference to those infections transmitted by contagion, syphilis excepted.

E. H.

Delorme (M.) & Anderson (T. E.). Réveil de l'infection à *Spirochaeta duttoni*, déterminé chez la souris blanche par inoculation de *Trypanosoma brucei*. Infection mixte trypano-spirochétienne. [**Recrudescence of** *S. duttoni* **Infection, produced in White Mice by Inoculation with** *T. brucei*. **Mixed Infection of Trypanosomes and Spirochaetes.**]—*C. R. Soc. Biol.* 1928. May 4. Vol. 98. No. 14. pp. 1183–1185. [4 refs.] [Pasteur Inst., Paris.]

In mice that had apparently recovered from infection with *Spirochaeta duttoni* the inoculation of *Trypanosoma brucei* about two months after the first infection was followed by the reappearance of spirochaetes in the blood, along with the trypanosomes. By means of various tests these spirochaetes were shown to be identical with the Brazzaville strain of *S. duttoni* used for the original infection.

E. H.

Galliard (H.). Guérison spontanée de l'infection mixte à *Trypanosoma brucei* et *Treponema crocidurae* chez la souris blanche. [**Spontaneous Recovery from a Mixed Infection of** *Trypanosoma brucei* **and** *Treponema crocidurae* **in the White Mouse.**]—*Bull. Soc. Path. Exot.* 1928. Apr. 18. Vol. 21. No. 4. pp. 315–316.

It is well-known that animals with mixed infections of trypanosomes and spirochaetes tend to suffer from a chronic infection. The author has found that mice inoculated with a mixed infection of *Trypanosoma brucei* and *Spirochaeta crocidurae* may sometimes completely recover. In two such cases the trypanosomes were present in the blood only

for three days and spirochaetes for twelve days. The animals both had spirochaetal relapses after which their blood became negative and no signs of either infection could subsequently be found.

E. H.

Sazerac (R.) & Vaurs (R.). Action de l'arsenic, en tant que corps simple, sur les spirochètes et les trypanosomes. [**The Action of Free Arsenic on Spirochaetes and Trypanosomes.**]—*C.R. Soc. Biol.* 1928. July 6. Vol. 99. No. 23. pp. 372–373. [2 refs.] [Pasteur Inst., Paris.]

In view of the favourable results obtained by the use of metallic mercury or bismuth for the treatment of syphilis, the authors tested the action of free arsenic, in the uncombined state, obtained by the precipitation of arsenious acid by sodium hypophosphite. The arsenic was found to have a slight curative effect on rabbits infected with *Spirochaeta cuniculi* and rats infected with *Trypanosoma brucei*, but its action was much inferior to that of bismuth and therefore it is unlikely to be of use for the treatment of these types of infection.

E. H.

Aristowsky (W. M.) & Schaechter (E. P.). Beobachtungen an der Rickenberg-Brussinschen Reaktion beim Rückfallfieber des Menschen. [**Notes on the Rickenberg-Brussin Reaction in Human Relapsing Fever.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. Aug. 8. Vol. 57. No. 3/4. pp. 347–356. [Health Commissariat, Tartar Rep., & State Univ., Kazan.]

This reaction was obtained with the serum of a human patient inoculated with a culture of *S. recurrentis*. The blood was collected on the day following the fall in temperature. For the reaction to succeed it is necessary to use the plasma containing blood platelets, of a healthy animal, e.g., rat, guineapig, or rabbit, but not human blood. A positive reaction was obtained when the infected serum was diluted more than 1,000 times. The author's observations with this reaction support the view that in spirochaetal infection, antibodies and lysins are identical.

E. H.

Lins (Abdon). Révision des spirochètes. [**A Revision of the Spirochaetes.**]—*Rev. Med.-Cirurg. do Brasil.* 1928. July. Vol. 36. No. 7. pp. 293–306.

The author recognizes only five genera of spirochaetes, *Spirochaeta*, *Treponema*, *Cristispira*, *Saprospira*, and *Leptospira* and gives a list of about 200 spirochaetes arranged according to their source. The author's list of "valid" species is somewhat unfortunate as he commences with "*Leptospira icteroides*, the agent of yellow fever"; "*Leptospira morsus muris*, the agent of Sodoku"; "*L. gallica*, the agent of trench fever"; "*L. couvyi*, found in cases of dengue," etc., etc.!

E. H.

RUGE (Heinrich). Das Ausmessen von Spirochäten. [**The Measurement of Spirochaetes.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. July. Vol. 32. No. 7. pp. 376–380. With 4 text figs. [Inst. for Ship & Trop. Diseases, Hamburg.]

The author has compared the methods of measuring spirochaetes using four strains of relapsing fevers. The results show that relapsing fever spirochaetes cannot be distinguished with any certainty by their dimensions alone and the complicated schemes of measurement devised by DELAMARE and by Froilano DE MELLO are from this point of view of little value.

E. H.

SABRAZÈS (J.). A propos de la chromophilie comparée des spirochètes et de leurs divers modes de coloration à l'aide de la fuchsine de Ziehl. [**The Comparative Staining Properties of Spirochaetes and their Coloration by Ziehl's Fuchsin.**]—*C.R. Soc. Biol.* 1928. May 18. Vol. 98. No. 15. pp. 1275–1278. [9 refs.]

The author recommends fixation by heat followed by Ziehl's stain for the coloration of spirochaetes, except in the case of cultures containing albuminoid material, when it is advisable to use the Fontana-Tribondeau method before staining [see this *Bulletin*, Vol. 25, p. 612].

E. H.

GELONESI (G.). Di uno strano reperto in alcune spirochetosi. [**A Peculiar Structure found in some Spirochaetes.**]—*Ann. di Med. Nav. e Colon.* 1928. July–Aug. Year 34. Vol. 2. No. 1–2. pp. 54–58. With 1 plate.

The author, when examining smears from local spirochaetal lesions, noticed thickened spirillar or club-shaped terminations to some of the organisms. They resemble the Vibriothrix described by CASTELLANI He considers the question whether they are degenerative forms of treponemata or new organisms, and appears to incline to the former explanation. A microphotograph shows the structures very clearly.

H. Harold Scott.

LEGER (Marcel). As Spirochetoses humanas.—*Rev. Med.-Cirurg. do Brasil.* 1928. Aug. Vol. 36. No. 8. pp. 325–344.

NICOLLE (Ch.), MATHIS (C.) & ANDERSON (Ch.). Sur l'unicité des spirochètes récurrents du groupe Dutton —*C.R. Acad. Sci.* 1928. Oct. 15. Vol. 187. No. 16. pp. 631–632.

LEPTOSPIROSES.

Anjow (Saburo). Vergleichende Untersuchungen über die Widerstandsfähigkeit verschiedener Leptospiren (Spirochäten) gegen äussere Einflüsse. [**A Comparative Study of the Resistance of Various Leptospirae to External Agents.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. Oct. 26. Vol. 109. No. 1/4. pp. 61–80. [29 refs.] [Med. Clinic, Imperial Univ., Tokyo.]

The author has compared the effects of various agents on nine strains of pathogenic Leptospira and two of the water forms. When cultured in the presence of various metals, iron, lead, mercury and copper, the water strains were unaffected, but the others showed varying degrees of resistance. Copper was the most toxic metal; in its presence all the cultures, with one exception, being negative after three days. Mercury came next and, with the exception of two Akiyami strains, all the cultures were negative after three to seven days. Lead was toxic to cultures of *L. icterohaemorrhagiae* and *L. icteroides* and one strain of Akiyami B, and this same strain was killed by iron, which had little effect on any other forms. The metals were also added to well-developed cultures as well as those just sown, and similar results obtained. Electro-collargol in dilutions of 1 in 100 was toxic to all cultures except *L. hebdomadis* and electro-selenium in dilutions of 1 in 250 killed all cultures except Akiyami B ; in both cases the water strains were unaffected. When cultures were kept in various dilutions of serum the latter were much more resistant than the pathogenic forms. An increase in the concentration of the salt in the culture media to 1·4 per cent. was fatal to all except an Akiyami B and the water strains. This Akiyami strain was only slightly affected when the concentration was increased to 1·5 per cent., which was fatal to both the water strains. Bile salts also gave similar results. Saponin had no appreciable effect on the spirochaetes, but acid in the dilutions of 0·1 to 0·2 per cent. killed all the forms examined within a few minutes. All the strains would live at temperatures from 10° to 37° C. but rapidly died at 42° C. When cultured in the presence of various other bacteria such as *Bact. coli communis, Bact. coli haemolyticus,* streptococci, typhoid and paratyphoid, varying degrees of resistance were demonstrated. Summarizing the results, it is seen that the various strains of *L. icterohaemorrhagiae,* including *L. icteroides,* form one group, *L. hebdomadis, L. febrilis* and Akiyami, types A and B, another group, and the water strains a third more resistant group. It should be noted that *L. febrilis* in its serological properties seems to approach the typical *L. icterohaemorrhagiae,* but in resistance more closely resembles *L. hebdomadis.*

E. Hindle.

Stéfanopoulo (G. J.) & Hosoya (S.). Sur les spirochétidés agents de la "fièvre d'automne" du Japon. (*Spirochaeta autumnalis* types A et B). [**The Spirochaetes of Japanese Autumnal Fever** (*S. autumnalis* **Types A & B**).]—*C.R. Soc. Biol.* 1928. May 18. Vol. 98. No. 15. pp. 1317–1320. [1 ref.]

The authors have studied these two strains of spirochaetes and obtained interesting results on their nature.

S. autumnalis type A was found to produce jaundice in guineapigs in the same way as *L. icterohaemorrhagiae*, but the haemorrhages were always more abundant with the former infection. Moreover, haematophagy and neutrophagy were observed in the spleen. The disease is difficult to reproduce in rabbits, but one success out of six was obtained by the intratesticular inoculation of 2 cc. of a very virulent culture. The rabbit died six days after inoculation and spirochaetes were found in the heart blood.

When the strain was first tested against the serum of 13 convalescents from spirochaetal jaundice, only one of them produced any agglutination of *S. autumnalis* type A. After being kept in the laboratory for eight months the strain was much more often agglutinated by such sera, but always to a less degree than *L. ictero-haemorrhagiae*. Thus a horse anti-serum agglutinated *S. autumnalis* A in dilutions of 1 in 1,000 and *L. icterohaemorrhagiae* diluted 1 in 50,000. Conversely, a rabbit anti-*autumnalis* A serum, agglutinated the homologous organism in dilutions of 1 in 500, but *L. icterohaemorrhagiae* required 1 in 100. Both these sera had no agglutination effect on *S. autumnalis* B and *S. hebdomadis*. Using Pfeiffer's reaction, the two types of *autumnalis* and *L. ictero-haemorrhagiae* could be clearly distinguished, but nevertheless type A and the latter strain were shown to be related and preservation in the laboratory has made this relationship more evident.

S. autumnalis B. This organism produces only a mild infection in guineapigs. Serological studies showed that the strain is absolutely identical with *S. hebdomadis*.

[The work of BAERMANN, ZUELZER and others suggests that all leptospira are closely related, and under laboratory conditions tend to become a single type. The above results partly confirm this view, but also show that in the cases examined there are distinct serological differences when the strains are recently isolated.]

E. H.

SHIOZAWA (Soichi). Immunologische Bezeihung zwischen verschiedenen Leptospiren. [**The Immunological Relationships of Various Leptospira.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. Oct. 26. Vol. 109. No. 1/4. pp. 80–93. [25 refs.] [Med. Clinic, Imperial Univ., Tokyo.]

SHIOZAWA (Sohichi). [**On the Immunological Specificity of Leptospira Species.**]—*Iji Shimbun* (*Med. News*). 1927. Oct. No. 1221. [Summarized in *Japan Med. World.* 1928. Feb. 15. Vol. 8. No. 2. p. 39.]

The author has studied the serological reactions of various strains of Leptospira and gives the results of agglutination experiments, culture in the presence of immune sera, Pfeiffer's reaction, etc., and also of various infection experiments. The results are given in tabular form and support the view that *L. hebdomadis*, and the related Akiyami types A and B, are distinct from *L. icterohaemorrhagiae*. *L. icteroides* is found to be identical with the latter, and *S. febrilis* is also closely related to it. The two water strains studied were found to be very distinct from the pathogenic forms in their serological properties.

E. H.

GARDNER (Gerard). Agglutination du *Spirochaeta pseudo-icterohemorragiae* (souche aquicole de Vinzent) au cours des cultures successives. [**The Agglutination of "*Sp. pseudo-icterohaemorrhagiae*" (Vincent's Water Strain) in Successive Cultures.**]—*Bull. Acad. Méd.* 1928. Oct. 9. Year 92. 3rd Ser. Vol. 100. No. 33. pp. 961–963. [5 refs.]

A comparison of a strain of *L. icterohaemorrhagiae* isolated from a case of Weil's disease in 1916 and subsequently maintained in cultures, and Vincent's water strain, which was isolated in 1926. The results show that sera which strongly agglutinate the former strain, also agglutinate the water spirochaete, whereas in 1927, MICHAÏLOFF found that the two were quite distinct. Although the author was unable to infect guineapigs with the water strain, his results suggest that after prolonged culture this organism is approaching the typical pathogenic form in its serological properties.

E. H.

SANARELLI (G.). Sur la pathogénie des spirochétoses ictérogènes [**On the Pathogenicity of Icterogenic Spirochaetoses.**]—*Bull. Acad. Méd.* 1928. Oct. 30. Year 92. 3rd Ser. Vol. 100. No. 36. pp. 1066–1070.

During an attempt to enhance the virulence of a spirochaete by passage through guineapigs, the author noticed that the infected eanmals frequently showed secondary invasion with other bacteria, spiecially streptococci, and paratyphoid bacilli. Moreover, in cases of infectious jaundice in human beings, the latter organism is frequently present in the blood. Consequently, the author in conjunction with Dr. PERGHER, tested three strains of Leptospira, in different species of animals, in order to discover the exact mechanism in the production of jaundice. The strains employed were *Leptospira icteroides, L. icterohaemorrhagiae* and *L. autumnalis*. The results seem to indicate that these organisms, in themselves, do not produce very fatal toxins, but in all cases when there was a cessation of febrile symptoms (often accompanied by jaundice, followed by the death of the animal), one could cultivate various bacteria from the blood and organs, even in the absence of spirochaetes. The results of pathological examination suggest that these secondary organisms, in themselves, are able to produce the characteristic symptoms, but rarely so severely as to cause death.

These organisms invade the animal after the sudden fall in temperature and are found to be fairly constant for each species. Thus guineapigs are usually invaded by streptococci, more rarely by paratyphoid bacilli; rabbits are generally infected by coli bacilli; young dogs by a variety of organisms, streptococci, coli bacilli, staphylococci, paratyphoid bacilli, etc.; and human beings generally show the presence of paratyphoid bacilli. These invasions are not due to a diminution in the bactericidal properties of the blood, but are a result of the destruction of the liver and spleen tissue by the direct action of the spirochaetes.

According to the author it is possible to reproduce artificially the pathological appearances of fatal spirochaetosis by inoculating an animal intraperitoneally with a mixture of fresh blood and the bacteria generally found after death, as indicated above. This inoculation

should be given to an animal infected with spirochaetosis 12 to 24 hours after the end of a febrile attack. By varying the organisms inoculated in this manner, it is possible to obtain a large range of pathological types, including all those characteristic of epidemic jaundice.

E. H.

KATHE. Das sogen. Schlammfieber in den Jahren 1926 und 1927. Beiträge zur Symptomatologie, Epidemiologie, Pathologie und Aetiologie. [**The So-called Slime Fever in 1926 and 1927. Notes on the Symptomatology, Epidemiology, Pathology and Aetiology.**] —*Cent. f. Bakt.* I. Abt. Orig. 1928. Nov. 7. Vol. 109. No 5/6. pp. 284–310. With 5 text figs. & 13 figs. on 3 plates. [36 refs.]

A detailed account of an epidemic of this disease in Germany which seems to have been very prevalent in many districts. In Ohlau, for example, the number of recorded cases during 1926 rose from 1 or 2 in June to more than 700 in July, 310 in the period 18th to 24th inclusive; in August the number rapidly fell to about 150, and in September only isolated cases occurred.

The symptoms are described in great detail. As a rule the attack begins with a rise in temperature, up to 104° F., accompanied by rigor, headache and pains in the back and limbs. The pulse is accelerated, and sometimes feeble. The tongue is thickly coated, but the edges are often normal. The face is very red and the eyelids inflamed. Generally the stomach and alimentary canal are affected, showing a variety of symptoms. The fever generally lasts for about 4 to 6 days after which the patient makes a simple recovery. The prognosis is very favourable, but during the Bavaria epidemic 25 deaths were recorded; of these all but five showed symptoms of other diseases.

The pathological anatomy of two fatal cases is described and illustrated and in one of these a spirochaete resembling *L. icterohaemorrhagiae* (*icterogenes*) was found in the kidney and also obtained by making a culture from the blood on the fourth day of the fever.

The author then gives a long account of slime fever, with special reference to its occurrence in Germany, from which it would seem that the disease is an abortive form of Weil's disease and that the infection is generally acquired during bathing or swimming. The results support BAERMANN and ZUELZER'S views [see this *Bulletin*, Vol. 25 p. 602] that under certain conditions the ordinary water spirochaete may become pathogenic.

E. H.

MOCHTAR (Achmad). Reinkulturen von Leptospiren durch Filtrieren oder Zentrifugieren von verunreinigtem Material. [**The Isolation of Pure Cultures of Leptospira by the Filtration or Centrifugation of Contaminated Material.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. June 20. Vol. 107. No. 6/7. pp. 374–377. [1 ref.] [Inst. of Trop. Hyg., Amsterdam.]

The author mixed cultures of Leptospira with *Pseudomonas pyocyanea* and filtered the resulting mixture through Berkefeld N candles. Only three pure cultures out of ten were obtained, the others being contaminated. Similar results were also obtained with impure cultures

of water spirochaetes prepared by Hindle's method. In this connexion the author remarks that although the growth of saprophytic spirochaetes is favoured by this method, it is possible that any pathogenic leptospiras present in the original water sample might be destroyed by the growth of saprophytic bacteria and the consequent fouling of the water.

The best method of isolating the leptospiras from contaminating bacteria was found to be centrifugation. A speed of 3,000 revolutions per minute continued for one hour was found to bring down all bacteria, whilst leptospira could still be found in the supernatant fluid. Consequently, pure cultures can be obtained by this method with much greater ease than by the use of filtration.

E. H.

Bessemans (A.) & Nélis (P.). Sur la fixation du complément dans la spirochétose ictérohémorragique. [**Fixation of Complement in Spirochaetosis icterohaemorrhagica.**]—*C. R. Soc. Biol.* 1928. May 4. Vol. 98. No. 14. pp. 1234–1236. [10 refs.] [Inst. of Hyg. & Bact., Univ., Ghent.]

The sera of 13 syphilitic patients, which all gave a strongly positive Wassermann reaction, gave negative results when tested for fixation of complement, using Leptospira cultures as antigen. Similar negative results were obtained when aqueous extracts of normal and infected livers were employed, except in one case when a positive reaction was obtained with the normal liver extract and none with the infected one. Eight of these sera were tested against alcoholic extracts and two were negative, but the other 6 gave strong fixation of the complement with both normal and infected livers. The sera of 12 normal persons were similarly tested and all were negative, except two, which gave positive reactions with both livers. The sera of 4 cases of spirochaetal jaundice, which all gave a negative Wassermann reaction, showed marked fixation of complement when tested against alcoholic extracts of both normal and infected livers, and also in three cases with cultures of Leptospira. Positive results were also obtained with the sera of a rabbit and a dog vaccinated against this infection. Five guineapigs and another rabbit similarly vaccinated gave negative results, as well as ten controls.

These results do not confirm previous statements to the effect that patients infected with spirochaetal jaundice often give a positive Wassermann reaction. Moreover, the positive results obtained by Martin and Pettit with syphilitic serum, employing as antigen the liver of a guineapig containing numerous leptospiras, might be explained as due to a Wassermann reaction instead of a Bordet-Gengou test.

E. H.

Tohyama (Yuzo). **Result of the Prophylaxis of Weil's Disease (Spirochaetosis icterohaemorrhagica) experimented in Kagoshima Prefecture.**—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1927. Vol. 6. pp. 555–557.

The author finds that the Leptospira of Weil's disease thrives in the water of the paddy fields and therefore tested various kinds of

fertilizers to see which killed the spirochaetes most readily. Calcium cyanamide was found to be the most satisfactory remedy and as it is also an excellent fertilizer, it was tested in some heavily infected rice fields. The year before the experiment there were 30 cases of Weil's disease amongst the workers in these fields, but after calcium cyanamide had been used only two cases occurred in the following season, although all the surrounding fields had large numbers of workers who became infected. In addition the rice crops in the experimental fields were very much higher than in other regions, one farm producing a crop more than 60 per cent. higher than the average for the province.

E. H.

Sazerac (R.) & Nakamura (H.). Sur le mécanisme de l'action préventive du bismuth contre la spirochétose ictérohemorragique. [**The Mechanism of the Protective Effects of Bismuth against** *Sp. icterohaemorrhagiae.*]—*C. R. Acad. Sci.* 1928. July 17. Vol. 187. No. 3. pp. 181–182. [2 refs.]

25 guineapigs were each injected subcutaneously with 0·01 gm. of sodium tartro-bismuthate per 100 gm. body weight. These were divided into five lots, and each lot of five animals inoculated with *Leptospira icterohaemorrhagiae* after intervals of 7, 15, 23, 32 and 45 days respectively. All the animals up to those inoculated 32 days after the bismuth injection remained healthy, whilst those inoculated after 45 days interval succumbed to the infection. Three animals inoculated simultaneously with a mixture of the bismuth compound and a virulent culture, remained uninfected after three months.

E. H.

Tixier (Léon) & de Sèze (Stanislas). Ictère spirochétosique professionnel d'origine fluviale avec double recrudescence fébrile. Etude comparative des trois courbes thermique, urinaire et uréique. [**Occupational Spirochaetal Jaundice of Aquatic Origin, with Two Febrile Relapses. A Comparative Study of Three Curves, Thermic, Urinary, and Urea Salts.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1928. July 26. Year 44. 3rd Ser. Vol. 52. No. 26. pp. 1336–1340. [6 refs.]

The description of a case of Weil's disease in a dredger, who almost certainly acquired the infection from the mud in which he was working. A second case was also observed from the same locality. The symptoms are described in detail and particulars are given of the results of analysis for urine salts. The patient entered hospital with a raised azotaemia (3 gms.) and scanty urine (1 litre) and was without fever; the azotaemia rapidly fell to 0·44 gm. accompanied by diuresis (2·5 l.) Then occurred the first febrile recrudescence. This was followed by renewed azotaemia (0·75 gm.) and scanty urine (1 l.). The temperature then fell to 37° C. When he finally recovered the urine salts fell to normal (0·27 gm.) and a second urinary crisis (3 l.) occurred. A second febrile recrudescence was followed by recovery.

E. H.

DE LAVERGNE (V.). D'une forme chirurgicale de la spirochétose ictéro-hémorragique. [**A Surgical Form of Weil's Disease.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1928. Nov. 15. Year 44. 3rd Ser. Vol. 52. No. 30. pp. 1498–1502. [7 refs.]

A patient fell into some mud at the bottom of a ditch and received cuts and bruises on his head and hands. Sixteen days later he developed an attack of spirochaetal jaundice. The diagnosis was made on the 25th day from the result of a serological reaction.

E. H.

URTUBEY (L.). Un caso de leptospirosis icterohemorragica. [**A Case of Weil's Disease.**]—*Med. Paises Cálidos.* Madrid. 1928. Sept. Vol. 1. No. 5. pp. 446–450. With 1 fig. French summary p. 450.

The author records a case of this disease in Cadiz.

E. H.

RUGE (Heinrich). Neuere Literatur ueber Weilsche Krankheit und Siebentagefieber. [**Recent Publications on Weil's Disease and Seven Day Fever.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Aug. Vol. 32. No. 8. pp. 412–432. With 1 text fig. [Numerous refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

A useful summary of recent work.

E. H.

TURKHUD (D. A.). A Note on Weil's Disease, or Leptospirosis Icterohaemorrhagica.—*Indian Med. Gaz.* 1928. Oct. Vol. 63. No. 10. pp. 583–588. With 4 charts in text.

RAT BITE FEVER.

SCHOCKAERT (J.). Contribution à l'étude de sodoku. [**Contributions to the Study of Sodoku.**]—*Arch. Internat. Méd. Expêrim.* Liége. 1928. May. Vol. 4. No. 1. pp. 133–227. With 8 text figs. [94 refs.] [Bact. Inst., Univ., Louvain.]

A detailed study of this disease with a useful summary of previous observations. The first part is devoted to a consideration of the disease itself, mainly from a clinical aspect and in this is included an account of six cases experimentally infected with sodoku. These six patients showed varied symptoms but none of them agreed with the usual clinical manifestations of the disease. Two strains of the spirillum were employed and the symptoms of the six cases are summarized in the following table :—

Case.	Strain.	Maximum temperature.	Local 'reaction.'	Exanthem.	Immunity in vitro	
					Paris.	Louvain.
1 ...	Paris (human) ...	103·8	+++			
2 ...	,, ,, ...	104·0	+++	++	+++	+++
3 ...	,, ,, ...	104·0	+++	++	+++	+++
4 ...	,, ,, ...	100·6	++		++	++
5 ...	Louvain (mouse) ...	100·4	+			+
6 ...	,, ,, ...	101·6	++		+	+++

Quinine was found to be without action on the infection but the injection of high doses of sulpharsenol had a curative effect. From the point of view of treating cases of paralysis sodoku would seem to be much inferior to malaria or relapsing fever.

The spirillum was never found by direct examination of the patient's blood, yet experimental animals inoculated with blood, taken up to the commencement of the disease, became infected and showed large numbers of spirilla in the circulation. After the disease has become established they become localized in the tissues and in man disappear from the general circulation.

The second part of the paper comprises a description of the etiological agent with observations on its biology. The author concludes, in accordance with other observers, that all the different strains of *Spirillum* that have been isolated from human beings, rats and mice, constitute a single species and cannot be subdivided into different varieties, such as *morsus muris* and *muris*, respectively from the rat and mouse.

A study of these strains showed very varying degrees of virulence. The author's mouse strain was infective to man and guineapigs; on the other hand, one of the rat strains was found to be non-virulent for guineapigs. Finally a human strain, which at first was highly virulent, gradually lost its virulence until it became almost identical with a recently isolated mouse strain. Immunity reactions also supported this view.

The serum of recovered animals is both preventive and curative, but it is difficult to obtain sufficient serum for it to be of practical use. Compounds of both arsenic and antimony are efficacious therapeutic agents, bismuth a doubtful one.

Spirillum minus was found to influence favourably cases of paralysis and also to have an effect on trypanosomiasis comparable with that exercised by *Spirochaeta duttoni*.

The motility of *S. minus* is not influenced by hypoglycaemia, at least such as one obtains it in the last stages of trypanosomiasis infection in mice.

E. Hindle.

McDermott (E. N.). **Rat-Bite Fever: a Study of the Experimental Disease, with a Critical Review of the Literature.**—*Quarterly Jl. Med.* 1928. Apr. Vol. 21. No. 83. pp. 433–458. With 4 figs. [108 refs.]

A study based on observations on a strain of rat-bite fever isolated from a boy in Edinburgh who became infected as the result of the bite of a rat. Experimental infection was produced in mice, white rats, guineapigs, rabbits, cats, ferrets and *Macacus rhesus*. With infected mice filtration experiments with the spleen gave negative results. In addition a newly born mouse from an infected mother failed to produce infection when ground up and inoculated into a number of healthy mice.

In rats the disease showed the following phases: an incubation period; a primary inflammatory lesion, the organism being localized to the lesions and regional lymphatics at this stage; a secondary stage, during which the organisms are present in the blood; a latent stage, in which the blood is free from spirilla and there are no obvious

lesions ; a tertiary stage, with gummatoid lesions. The resemblance to syphilis is obvious.

In guineapigs the course of the disease was typical. The serum of infected animals at the late stages of the disease in dilutions of 1 in 8 immobilized the spirilla in mouse blood, including a strain of *S. laverani.*

A monkey inoculated subcutaneously with infected guineapig blood, showed a number of febrile attacks, and 176 days after inoculation the axillary lymphatics were removed and inoculated into a guineapig, which developed an attack of latent spirillosis. On the 300th day some of the mesenteric glands were removed but failed to produce infection when inoculated into other animals.

Two ferrets were infected by subcutaneous inoculations, and showed the presence of spirilla in the blood, but there was no local inflammatory reaction. One of the animals was killed on the 50th day and the spleen found to be greatly enlarged ; the other animal died on the 77th day with paralysis of its limbs. It had a well marked bilateral keratitis with profuse discharge.

A study of the various strains isolated from rodents and cases of rat-bite fever in man, leaves no doubt as to their identity. Infection probably results from the introduction into the bite of material from late lesions of the eyes, nose, lungs, or upper alimentary tract ; but there is also the possibility of inoculation of blood from the abraded buccal mucosa, or of saliva.

Finally, the author brings forward evidence suggesting the existence of a strepto- or leptothrix pyaemia transmissible to man by the bite of the rat, which may be confused with true spirillary rat-bite fever.

E. H.

Ishizu (Yoshitada). Ueber das Blutbild und die haematopoietischen Organe (Knochenmark, Lymphdrüse und Milz) bei der experimentellen Rattenbisskrankheiten (Meerschweinchen). [**The Structure of the Blood and Haematopoietic Organs (Bone Marrow, Lymph Glands and Spleen) in Experimental Rat-Bite Fever (Guineapigs).**]—*Scientific Reports Govt. Inst. Infect. Dis.* Tokyo. 1927. Vol. 6. pp. 267–268.

Infected guineapigs are found to show a distinct leucocytosis with a relative and absolute diminution in the number of lymphocytes, and a more or less distinct increase in the pseudo-eosinophiles and monocytes. The red blood cells and haemoglobin content fall gradually, resulting in a distinct anaemia, with changes in the erythrocytes such as poikylocytosis, anisocytosis, and basophile granules in the red cells. The spleen is generally swollen and microscopic examination shows distinct atrophy of the follicles, swelling and loosening of the reticulo-endothelium and increase of the plasma cells. The mesenteric lymphatics show atrophy of the capsule and occasional groups of lymphocytes ; the centre of the gland shows an increase in the reticulo-endothelium and plasma cells. The bone marrow of the femur contains few erythroblasts but numerous pseudo-eosinophile myelocytes ; and also there is a relative increase of pseudo-eosinophile leucocytes.

E. H.

NAKAMURA (Sohji). [**On the Serum Diagnosis of Rat Bite Fever.**]—*Nihon Densenbyogakkwai Zasshi* (*Jl. Infect. Dis.*) 1928. Feb. Vol. 2. No. 5. [Summarized in *Japan Med. World.* 1928. July 15. Vol. 8. No. 7. p. 191.]

The author has succeeded in obtaining a complement fixation test for rat-bit fever. As antigen he employed an alcoholic extract of a [presumably infected] guineapig's heart, 1 gm. in 5 cc. of alcohol. This was diluted with three times its volume of alcohol and to each 5 cc. of the resulting liquid was added 0·3 cc. of a 1 per cent. alcoholic extract of cholesterol. The preparation was again diluted with six times its volume of saline solution. The test was tried on four cases which all gave positive results.

E. H.

SCHLOSSBERGER (H.). Chemotherapeutische Versuche bei der Rattenbissinfektion der weissen Maus. [**Chemotherapeutic Trials in Rat Bite Fever of the White Mouse.**]—*Ztschr. f. Hyg. u. Infektionskr.* 1928. July 3. Vol. 108. No. 4. pp. 627–636. [Numerous refs.] [State Inst. for Experim. Therap., Frankfurt a.M.]

Details are given of the results obtained with a variety of compounds in the treatment of mice infected with *Spirillum minus*. The following were found to have no effect on the infection : trypaflavin, tryparosan, colloidal iodine, silver methylene blue, collargal, tartar emetic, calomel, triphenyl bismuth, sanocrysin, krysolgan, sodium chaulmoograte, quinine hydrochloride, optochinin hydrochloride, emetin hydrochloride, Bayer 205, stibenyl, stibosan, antimosan, Preparation 2952, Albert 188, silver salvarsan, and neosalvarsan in 10 per cent. milk sugar solution.

Complete sterilization of the mice was only obtained by the use of the following organic arsenical compounds : Stovarsol, sulphoxysalvarsan, neosalvarsan, and neosilversalvarsan.

E. H.

STEWART (R. Cameron). **A Case of Rat Bite Fever.**—*Canadian Med. Assoc. Jl.* 1928. Nov. Vol. 19. No. 5. pp. 575–577. With 1 chart in text.

A general account of the disease followed by a description of a case in a Montreal infant seven months old, who was bitten by a rat. Although spirilla were not observed there is little doubt as to the diagnosis, and the baby was given an intramuscular injection of 70 mgm. sulpharsphenamine at the height of a febrile attack. The temperature afterwards remained practically normal and all symptoms disappeared, but a second injection of 105 mgm. of the drug was given eight days later as a precautionary measure. The hospital records seem to show that sodoku is a comparatively rare disease in Canada.

E. H.

DA SILVA (Ribeiro). Um caso de "sodoku" em S. João d'El-Rey. [**A Case of Rat Bite Fever in S. João d'El-Rey (Rio de Janeiro).**] —*Brasil-Medico.* 1928. Sept. 29. Vol. 42. No. 39. pp. 1092–1093.

The author affirms that cases of rat bite fever in the South American states are sufficiently rare to warrant him in recording this.

A man, 36 years of age, was badly bitten on the right thumb by a large rat. The wound was treated immediately with Tinct. iodi. Ten days later he had a rigor, the wound became red and painful, lymphangitis and axillary lymphadenitis supervened and a papular erythematous rash appeared over the chest, back and front. There was severe pain in the left hip and a sensation as if his tongue was much swollen (this was not the case). The fever recurred periodically every 10–12 days with afebrile intervals of 4–6 days, the attacks terminating with profuse sweats. He was treated with neosalvarsan in doses of 30–40 cgm. and the illness lasted for two months.

H. Harold Scott.

Clearkin (P. A.). **A Case of Rat Bite Fever contracted in the Laboratory.** —*Kenya & East African Med. Jl.* 1928. Sept. Vol. 5. No. 6. 196–200. With 1 chart.

A laboratory attendant, in Tanganyika, was bitten by a black rat and seven days later developed a typical attack of rat bite fever which required three injections of N.A.B. before it was cured.

This is the first record of the disease from Tanganyika, but in view of the fact that natives are often bitten by rats the author considers it possible that some of the refractory ulcers of the extremities may be due to this infection.

E. H.

Knowles (R.) & Gupta (B. M. Das). **Rat Bite Fever as an Indian Disease.**—*Indian Med. Gaz.* 1928. Sept. Vol. 63. No. 9. pp. 493–512. With 1 text fig., 13 charts & 2 coloured plates. [44 refs.]

During the last five years the authors have observed 30 to 35 cases of this disease and in the present article give details of 28 cases. The disease would seem, therefore, to be fairly common in India. The best methods of laboratory diagnosis were found to be direct examination of the serous exudate from the local lesion, and inoculation of the patient's blood into white mice and guineapigs. The latter method succeeded in 23 out of 26 cases. The blood of 23 rats (*Rattus norvegicus*) in Calcutta city was examined by dark ground illumination, and spirilla were found in five of them.

E. H.

AMOEBIASIS AND DYSENTERY.

Amoebiasis.

Remlinger (P.). La dysenterie amibienne au Maroc et en particulier à Fez. [**Amoebic Dysentery in Morocco and Especially Fez.**]—*Rev. d' Hyg. et de Méd. Préventive.* 1928. Sept. Vol. 50. No. 9. pp. 641–656. [Refs. in footnotes.]

The author reviews in some detail the records of amoebic dysentery in Morocco, and more particularly in Fez—a country and a town with a great and evil reputation, thoroughly justified, for dysentery. Not only is the disease common among residents, but travellers from Morocco frequently suffer from dysentery after their return to France ; and not only dysentery but from ailments due to invasion of other organs by the amoebae—for a great proportion of the dysentery of Morocco is held to be amoebic. As to sanitation in that country, things to-day are as they always were—bad. The author sounds a note of warning that the dysenteric amoeba of Morocco may yet find a more favourable new home in the south and west of France than proved to be the case in the north and east during the war.

[In India, Irak, Palestine and Egypt, it is slowly becoming known that bacillary, not amoebic, is by far the more common dysentery; Morocco's turn will come.]

H. M. Hanschell.

Yoannovitch (G.). La dysenterie amibienne dans la Serbie du Sud. [**Amoebic Dysentery in Southern Serbia.**]—*Bull. Office Internat. d' Hyg. Publique.* 1928. July. Vol. 20. No. 7. p. 1061.

During the war 1914–1918, E. Ivanitch demonstrated several cases of amoebic dysentery among the Serbian troops on the Monastir front, and after the war Rankov discovered several cases among the inhabitants of Monastir. Castellani found cases, during the war, at Skoplje, where in 1927 T. Simitch discovered two imported and two autochthonous cases. Among those attending school in Skoplje he has found 2 per cent. carriers of four-nucleated cysts, some, he is convinced true cysts of *Entamoeba histolytica.* The cases of amoebic dysentery have been successfully treated by yatren 105, *per os.* They were " practically cured " in eight days.

H. M. H.

James (William M.). **Some Observations on Intestinal Amoebiasis due to Infection with** *Entamoeba histolytica.*—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1927. pp. 185–200. With 10 figs.; also in *Ann. Intern. Med.* Ann Arbor. 1928. Aug. Vol. 2. No. 2. pp. 171–176.

——. **Human Amoebiasis due to Infection with** *Entamoeba histolytica.* —*Ann. Trop. Med. & Parasit.* 1928. Aug. 28. Vol. 22. No. 2. pp. 201–258. With 17 plates. [30 refs.]

In these two papers the author covers the same ground. In the *Annals of Tropical Medicine & Parasitology* he has dealt most fully with the subject and illustrated a careful and very interesting thesis with excellent plates displaying clearly the pathological histology of

amoebiasis of the gut, the liver and the skin. It is difficult, in a summary, to do justice to this full paper from one whose long experience of the disease in Central America, exacting standard of diagnostic accuracy and habit of critical sane analysis of many tested observations in pathology and therapy, have given him every claim to authority. From 1911 to 1914 the author, with DEEKS, had worked mostly on cases with histories of amoebic dysentery. But during that period routine examination of stools of patients admitted to Ancon Hospital for other causes often revealed small cystic and precystic entamoebae indistinguishable from cyst-forming and end stages of the *histolytica* associated with dysentery. Many of these cases had had diarrhoea, and gastro-intestinal discomfort at times, but no dysentery. At the same time H. C. CLARK demonstrated at autopsy active amoebic ulceration, mostly in the caecum, but often elsewhere in the large gut, in patients dead from causes other than dysentery, and in whom at time of death there was neither dysentery nor diarrhoea. There could be then considerable ulceration of the large gut without history of diarrhoea or dysentery. In retrospect the author realizes that the small pre-cystic and cyst-forming *histolytica* had been often overlooked in routine stool examinations.

Since 1916 the author has personally examined stools from all his patients with gastro-intestinal disturbance of any kind, and for the past three years has checked positive or doubtful findings with wet fixed permanent preparations. Soon he found that "latent *histolytica infections*" far exceeded those associated with dysentery at the time of examination. He is now convinced that in Central and Northern South America *histolytica* infection causes a very large proportion of obscure gastro-intestinal trouble not manifested by diarrhoea or dysentery as the cardinal symptoms. Of the five species of amoeba in man, there is no positive proof that four are in the least degree pathogenic. They are important in medical practice only because the fifth—*E. histolytica*—may be confused with any or all of them. Since 1916 important surveys by expert workers have been undertaken to determine not only how much *histolytica* infestation occurs in persons suspected of having acquired it previously, but also the extent to which the general population is infested. The author reviews these surveys in England, and North and South America, and deduces from the data presented that where the survey has been conducted by competent observers, the general population has shown an incidence of 5 to 10 per cent. of *histolytica* infestation in centres where amoebic dysentery itself is not endemic, and a higher percentage in endemic centres.

The author's own experience has shown him that vegetative forms of *histolytica*, excluding dysentery cases, are not accompanied by cysts in 50 per cent. of positive cases. If this is true of temperate climes, then the 5 to 10 per cent. incidence (founded on cyst findings) should be doubled. A parasite infesting 5 to 20 per cent. of the general population deserves interest. The clinical symptoms due to the grave lesions which the parasite may produce if at all common would not be missed at the bedside ; nor the lesions at autopsy, in England and the U.S.A., where the surveys have been made. It would therefore be logical to infer that in temperate climes the pathogenicity of *histolytica* infection is in inverse proportion to its frequency and distribution : that, except at rare intervals, it lives harmlessly in the gut lumen ; or else normally produces minute lesions in the colon mucosa which are healed almost as soon as formed. There is, however, no unanimity of opinion

as to the constant or infrequent pathogenicity of *E. histolytica*. DOBELL has noted in the cat's intestine ulceration recognizable with certainty only in sections under microscope. L. GETZ has procured similar sections from man's intestine. The author reviews the opinions of other workers. His own is that in the American tropics *histolytica* is for the most part pathogenic and produces more or less progressive intestinal ulceration. Although he has kept careful look-out, he has not often found *histolytica* in persons free from symptoms, who come from heavily infected areas. He does not believe, however, that in acute amoebic dysentery, mild amoebiasis,or in healthy infested persons ,the majority of the vegetative parasites live in the tissues. Normally, they live in lumen of upper colon, and tissue invasion is the part of the few not of the many.

For otherwise there is no accounting for (1) the enormous number of small vegetative forms and cysts sometimes found in stools in intervals between symptomatic renewals ; (2) the out of all proportion greater number of amoebae in stools in dysentery than is found in the tissues at autopsy ; (3) the lack of relation between damage found in abscess of liver and lung and number of amoebae. He cannot reconcile, therefore, survey findings in U.S.A. and England (though he fully accepts their accuracy) with his own clinical experience ; unless in those countries a different and less harmful *histolytica* type exist—and that he does not believe. The problem, for him, remains one of the many concerning *histolytica* yet unsolved. Neither can he accept that *histolytica* infection differs symptomatically in tropics and in temperate climes ; for the clinical pictures he observed in the Southern States of America among troops in 1918, of dysentery, diarrhoea, intestinal disturbance, liver abscess, due to *histolytica* infection were exactly those he had been for many years familiar with in Central America. At present there is justification for regarding *histolytica* infestation with deep distrust.

The author then describes and discusses the pathology of the gut infection. Fortunately the outer muscular coats of the gut offer great resistance to passage of amoebae and to their histolysing activity as well. The classic flask-shaped ulcer is not, in fact, the earliest type of lesion. During 1927 L. GETZ (Panama) has searched for, and several times found, the earliest lesion in man, specially interesting in one case, for there it was associated with early recrudescence and abscess of lung and liver after prolonged emetine therapy. Some of these lesions are too minute to be visible macroscopically. It appeared to the author and GETZ that the very earliest lesion was some solution and destruction of the mucosa before any appreciable degree of invasion had begun, and that this early lesion of mucosa was out of all proportion to the number of amoebae present. A section of intestinal wall 2·5 cm. long will show this lysis with only few amoebae in or on mucosa ; and a greater number of them in normal tissue. Congestion and thrombosis of the very small vessels are found in the earliest lesions when damage is entirely confined to the mucosa. This earliest lesion process may be found to have occurred throughout 6 inches or more of macroscopically normal mucosa. These lesions might readily heal without formation of scar, and the process be repeated, but finally ulcer begins. This would support the view that *histolytica* always lives at expense of host tissues ; and can so live indefinitely without causing further damage. GETZ's and the author's material give it no support, but indicate a progressive process, ending in ulcers (not always flask-shaped) ; or in

destruction of entire mucosa over a large area before appreciable invasion of gut mucosa begins. It follows then that *histolytica* should never be regarded as even temporarily a harmless commensal, but always as a subtle treacherous foe and treated as such.

The author cannot yet explain why *histolytica* remains clinically dormant over long periods, nor how it awakens into pathological activity. A clue is offered by the well-known tendency to relapse after dietary faults, over-exertion, or during convalescence from other infirmities. From cultures of the parasite it may be possible to determine the nature of its lytic ferment and the conditions under which it is produced. Autopsies gave no support to the view that systemic distribution of *histolytica* occurs.

As to diagnosis it is noteworthy that the author has directly (instrumental) examined the rectum and lower sigmoid in 100 cases of positive infection ; half showed a normal mucous membrane. Certain diagnosis of *histolytica* infection can be made by stool examination. If fresh material be obtained then 3 examinations suffice as a rule ; the author gets 75 per cent. positives on first examination, and 90 per cent. on the second. He again insists on the necessity of adequate training in the recognition of amoebae in stools, and on the use of wet-fixed stained preparations for the accurate differentiation of species. The author, in conclusion, offers the opinion that the canons governing diagnosis, pathology, and treatment of *E. histolytica* infection will not be closed for many years to come.

H. M. H.

Craig (Charles F.). **Symptomatology, Diagnosis and Treatment of Carriers of** *Endameba histolytica.*—*Jl. Amer. Med. Assoc.* 1928. Apr. 28. Vol. 90. No. 17. pp. 1345–1349. [19 refs.] [Army Med. School, Washington.]

It is now well established, the author writes, that many carriers of *Entamoeba histolytica* present definite symptoms of the infection and are really suffering from a chronic toxaemia due to the parasite. The symptom-complex of dysentery is actually the end-result of infection with *E. histolytica,* and for one case of amoebic dysentery which occurs there are hundreds of cases of amoebic diarrhoea, or various gastro-intestinal or nervous conditions, which are really due to the invasion of the intestine by this parasite. The aetiology of the symptoms observed in carriers is easily understood if it be borne in mind that the amoebas actually penetrate the intestinal mucous membrane and multiply within the tissues of that organ. The author has shown that extracts of *E. histolytica* are haemolytic to human, and other, red blood corpuscles, and cytolytic to the epithelial cells of mucous membrane of the gut. The minute entry lesions of the gut allow also of ingress of harmful bacteria and their toxins. A mixed infection is thus produced, which explains the multitude of symptoms present in the carrier and their great variation in severity.

E. histolytica thus brings about a real "focal infection" in the intestine. Musgrave and others have demonstrated at autopsy existence of marked ulcerative lesions in gut caused by *E. histolytica* without production of symptoms of dysentery. Inquiry revealed that many of these persons during life had complained of symptoms present in many carriers.

The author holds that while all carriers have microscopic lesions of gut many have macroscopic lesions as well. It is therefore impossible to assure even apparently healthy carriers of *E. histolytica* that definite ulceration of gut does not exist ; and strictly speaking there is no such thing as a " healthy " carrier of this parasite. Carriers may present as symptoms—chronic constipation with intervals of diarrhoea ; anorexia ; flatulent distension ; indigestion ; colic ; and any or all of the protean symptoms of neurasthenia. Physically carriers are often too thin ; there may be tenderness in the R. iliac region ; over descending colon or liver ; anaesthetic or hyperaesthetic patches on skin ; irritable slightly irregular pulse ; sweating of palms and soles of feet ; subnormal, and more rarely slightly elevated, temperatures. A noticeable sign is a slight pallor or yellowish tint of skin. Mild anaemia is present.

Diagnosis depends on examination of faeces. Negative reports should not be taken as conclusive until six samples taken at different times prove negative. By continuation of direct examination of faeces, culture of faeces, and concentration and sedimentation of faeces for cysts, every infection with *E. histolytica* can be diagnosed.

Using these three methods in the case of 116 officers at the Army Medical School, it was found that 17, or 14·6 per cent., were positive for *E. histolytica*. Of these one only gave a history of having had amoebic dysentery : " but careful inquiry elicited the fact that more than 75 per cent. showed definite symptoms which might have been caused by the infection, and proper treatment resulted in the disappearance of these symptoms and improvement in the health of the patient in every instance " [i.e., for 13 out of the 17 found positive ; although ready to hand were the 99 negatives, we must assume they in turn were not carefully searched for the symptoms which might have been caused by the infection, or the author would have told us]. The author considers that the general average of infections with *E. histolytica* in the U.S.A. is at least 10 per cent.

Treatment.—Of 17 " carrier " cases infected with *E. histolytica* treated by Acetarsone tablets by mouth, in all but two the parasites disappeared from the stools after one course of treatment, and in the two " resistant " cases after two courses. Eleven of these carriers have been under observation for more than six months and in all the faeces have remained negative for *E. histolytica*.

H. M. H.

Boeck (William C.). **The Incidence of Amebiasis and its Relation to the Carrier Problem.**—*U.S. Veterans' Bureau Med. Bull.* 1928. Sept. Vol. 4. No. 9. pp. 744–751. [22 refs.]

An interesting, sober, and concise review of a matter which has gone to the heads of too many. The author thinks it likely that *Entamoeba histolytica* may not be injuring its carriers when diarrhoea or dysentery are absent ; but that injury may be initiated following lowering of the host's resistance from whatsoever cause ; or perhaps from trauma of colon from bacillary dysentery or scybala. Neurasthenia occurs in carriers of *E. histolytica*. It is also of common occurrence in almost every kind of illness. Fatigue, irritability, apathy, dissatisfaction, hypersensitiveness to vague distress and pain, obtain in *E. histolytica* carriers as in carriers of other protozoal infections and other illnesses. They may have arisen before, during

the course of, or following, the infection or illness; but there is no definite evidence at present for designating them effects of the harbouring of *E. histolytica* in the colon. Their source is to be found in an unhappy and unsatisfactory environment. Active amoebiasis is characterized by diarrhoea, or dysentery, or colitis—conditions proved definitely to be due to pathologic changes, caused by the amoebae. Sometimes such cases become chronic over a period of years with acute or subacute exacerbations; then some of the "neurasthenia" symptoms may be encountered, as in any acute or subacute illness that for the time impairs the individual's health. Intermittent dysentery or diarrhoea calls for treatment. But patients without either may hardly be promised relief from neurasthenia by treatment of the amoebic infestation. The patient himself must be treated instead.

H. M. H.

Manson-Bahr (P. H.) & Willoughby (H. M.). **On the Leucocyte Count in Intestinal Amoebiasis and its Value as an Aid to Diagnosis.** —*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Aug. 22. Vol. 22. No. 2. pp. 125–130. [5 refs.]

An analysis of the leucocyte counts in 165 proved cases of intestinal amoebiasis occurring consecutively in the hospital practice of one of the authors. 74 were acute in symptoms and revealed vegetative forms of *E. histolytica* in the faeces. The 91 were chronic; i.e., little or no diarrhoea and cysts of *E. histolytica* in the faeces. All the blood counts were done by the same worker; and all computed on the same plan. The results, carefully tabulated, are therefore comparable. The authors conclude that—In acute intestinal amoebiasis, i.e., with active bowel symptoms and mucous stools containing active vegetative forms of *E. histolytica*, there is a leucocytosis of 11,000; with relative reduction of polymorphonuclears to 64 per cent., no disturbance of lymphocytes and large mononuclear cells, but a slight rise in the eosinophile count to 2 per cent., figures in close agreement with those obtained by v. Schilling-Torgau. In chronic cases with quiescent bowel symptoms and diarrhoeic stools containing cysts of *E. histolytica*, there is no rise in the total nmber of leucocytes; there is a relative decrease in polymorphonuclear cells to 57 per cent., a slight increase of lymphocytes to 34 per cent., and a definite rise in eosinophiles to 3 per cent. (no co-existing helminthic infection).

H. M. H.

Magath (Thomas B.) & Ward (Charlotte B.). **Laboratory Methods of diagnosing Amebiasis.**—*Amer. Jl. Hyg.* 1928. Sept. Vol. 8. No. 5. pp. 840–857. [39 refs.] [Mayo Clinic, Rochester, Minn.]

——. **The Diagnosis of Amebiasis.**—*U.S. Veterans' Bureau Med. Bull.* 1928. Sept. Vol. 4. No. 9. pp. 737–743.

A valuable paper recording the data of careful work on a matter of practical importance.

800 stools from 457 patients were examined. Fresh preparations were examined after the patient had taken Epsom salts and compared with slides stained with iron haematoxylin and with cultures from the fresh stools. There was 77 per cent. agreement in the examination of fresh preparations and stained slides and 34 per cent. agreement in

the examination of fresh preparations and cultures in which protozoa were found. A higher percentage of stools in which parasites were found was obtained by the examination of fresh preparations after the administration of Epsom salts than by any other method. Present cultural methods did not prove suitable for routine examination of stools for intestinal protozoa. The combination of fresh preparations following the taking of Epsom salts and stained slides was the best routine method. The authors record that sometimes amoebae found in the fresh preparation were incorrectly identified ; correct identification came on examining the stained preparation.

H. M. H.

Scuderi (Giovanni). Su di un caso epatite amebica colliquata con reazione pericardica e successiva apertura nella pleura e nel pericardio. [**Amoebic Abscess of the Liver with Extension into the Pericardium and the Pleural Cavity.**]—*Riforma Med.* 1928. June 4. Vol. 44. No. 23. pp. 683–684. [10 refs.] [Inst. of Path. & Clin. Med., Univ., Messina.]

A man 40 years old, had suffered, for the last two years of his life, from epigastric pain believed to be due to gastric or duodenal ulcer. He developed right-sided empyema ; 2 litres of turbid fluid being removed ten days, and another 1,200 cc. of pus eight days, before death. Exploratory puncture of the liver two days before death withdrew pus with *Entamoeba histolytica*. Autopsy revealed abscess in left hepatic lobe, and that the empyema communicated through a small aperture with the pericardial cavity. [No mention is made of any preceding attack of dysentery.]

H. Harold Scott.

Street (A.). **Abscess of Liver. With Case Reports.**—*New Orleans Med. & Surg. Jl.* 1928. May. Vol. 80. No. 11. pp. 701–708. [7 refs.]

Case I. No preceding dysentery, nor residence in tropics. Amoebic dysentery with positive stool findings appeared after operation. The abscess was on under surface of liver, and gave symptoms of peritonitis, as is usual in that situation. Operation—abdominal section, drainage of chocolate pus and, later, emetine therapy.

Case II. Amoebic abscess. No preceding dysentery, but residence in tropics. Abscess was near upper surface of liver. Cough and pain in chest as usual with abscesses in that situation. Operation—abdominal section, drainage of chocolate pus and, later, emetine therapy.

Case III. Bacterial abscess following suppuration in gall bladder. At onset symptoms and signs strongly suggested acute infection of gall bladder ; and later as abscess came to upper surface, were absolutely those of pneumonia. Operation—resection of rib and drainage.

Case IV. Subdiaphragmatic abscess following suppurative appendicitis with general peritonitis. Operation—resection of rib and drainage. Recovery in all four cases.

H. M. H.

Gilroy (J. Campbell). **Tropical Liver Abscess acquired in England.** [Memoranda.]—*Brit. Med. Jl.* 1928. Sept. 22. p. 529.

A man of 49 years ; caretaker at public abattoir. Eleven months before admission to hospital was taken ill with mucous diarrhoea. At different stages of his subsequent illness his condition appeared to be due to gall-stones, carcinoma, subphrenic abscess. There was bulging of right

hypochondrium with slight tenderness ; edge of liver reached to ½ inch below level of umbilicus. Diarrhoea persisted and later a large red oedematous tender swelling was seen in R. hypochondrium. X-ray showed R. diaphragm pushed up and immobile. At this stage examination of faeces revealed numerous *Entamoeba histolytica*. At operation abscess in liver was found and 2 pints of chocolate coloured pus evacuated. No amoebae or cysts found in the pus. He was given pulv. ipecac. co. ; and emetine-bismuth-iodide, gr. 1 t.i.d. Diarrhoea worsened. Emetine hydrochlor. injections were then given. The patient died seventeen days after operation. He had never been abroad nor to his knowledge been in contact with anyone who had suffered from amoebic dysentery.

H. M. H.

Tonelli (Lanfranco). La sindrome pseudo-appendicolare amebica. [**Appendicular Syndrome in Amoebiasis.**]—*Policlinico.* Sez. Prat. 1928. Aug. 6. Vol. 35. No. 31. pp. 1487–1492.

The author relates two cases of his own in detail and three from the literature briefly. The symptoms very closely resemble those of acute appendicitis ; the first patient was so diagnosed more than once. The general condition, however, is not so serious and the attacks often pass off in a couple of days, the diagnosis then being changed to appendicular colic. Constipation is absent, in fact the stools are often diarrhoeic and examination of them reveals the *Entamoeba histolytica*. On this being discovered, emetine in these cases brought about rapid cure. A table showing the points of difference is given.

H. Harold Scott.

Drennan (L. M.). **Appendicitis caused by** *Entamoeba histolytica*. **A Case Report. Notes on Amoebiasis in Colombia.**—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1927. pp. 130–133. [United Fruit Co. Hosp., Santa Marta, Colombia.]

No history of previous dysentery. *E. histolytica* present in stools. At operation, undertaken for other causes, a swollen inflamed appendix buried in adhesions was detected and removed. Smears from its lumen revealed *E. histolyitca*, pus, blood, and flagellates. The author insists on the clear amoebic aetiology of this appendicitis ; [which is puzzling, for] no ulceration was found in the appendix on macro- or microscopic examination ; and sections of it revealed the characteristic changes of chronic inflammation but no amoebae.

H. M. H.

Montel (M. L. R.) & Vielle (Albert). Un cas d'amibiase cérébrale. [**A Case of Cerebral Amoebiasis.**]—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 231–239.

The case, in an Annamite woman, is very fully described and discussed. Her blood gave a positive Bordet-Wassermann reaction. Following on a diagnosis of cerebral tumour the skull was trephined. Exploratory needle withdrew viscous sero-purulent pus which examined without delay in the laboratory revealed no pus cells, and no bacteria, but very scanty mobile amoebae. These could not be stained ; and culture of the fluid gave negative result. The authors consider the amoebic nature of the cerebral lesion proved, for on further enquiry they learnt, for the first time, that the patient had had dysentery in the past. They discuss the possible and probable route of infection of the brain.

R. Deschiens discusses the case briefly and with Attic salt. Those who have described cases of amoebic bronchitis, nephritis, cystitis, urethritis, and even amoebiaemia, have never produced the proof that these were amoebic cases. The proof required is presentation of permanent stained preparations demonstrating amoebae with their distinctive morphological and particularly nuclear, characters. Carvaillo introduced directly into the bladders of kittens, living dysentery amoebae and failed to set up cystitis ; although kittens are peculiarly susceptible to amoebic dysentery infections [which may have in them hepatic abscess sequela]. Macrophages are easily mistaken for amoebae in fresh material. Wet fixation and staining with iron haematoxylin clears up the confusion. [The gummy fluid with scanty large motile mononuclear cells and the positive Bordet-Wassermann make gumma more likely than amoeba—in spite of the previous dysentery.]

H. M. H.

Brown (Philip W.). **Treatment of Endamebiasis.**—*Ann. Intern. Med.* Ann Arbor. 1928. Aug. Vol. 2. No. 2. pp. 177–191. [19 refs.]

This study is based on observation of 178 cases in the Mayo clinic, from which enough data were available to give some idea of the therapeutic efficiency of the treatment employed. As a basis for efficiency of treatment the eradication of the parasite is held paramount.

The author's conclusions are that :—

1. The organic arsenical compounds and yatren seem to be valuable additions to the treatment of endamebiasis.
2. At present the most favourable results seem to be obtained from a combination of an arsenical compound and emetine. Auremetine by mouth may supplant emetine hypodermically except in very acute cases.
3. Treparsol and stovarsol are equally efficient, but since treparsol is rapidly eliminated, it would seem to be preferable to stovarsol.
4. Arsenic produces a small percentage of reactions. Indiscriminate usage of the drug is not without risk.
5. Recurrence is more probable in those with gross ulcerative lesions of proctodeum.
6. Certain cases seem to be very resistant to treatment, but persistence and variations in treatment should effect cure in most of such cases.

H. M. H.

Knowles (R.), Gupta (B. M. Das), Gupta (Ajit Kumar Dutt) & Gupta (Umapati). **The Treatment of Intestinal Amoebiasis : (an Analysis of Results, and a Review of the Literature).**—*Indian Med. Gaz.* 1928. Aug. Vol. 63. No. 8. pp. 455–482. With 1 graph in text. [168 refs.]

A very thorough, and long (necessarily), review of the matter. The patients dealt with in this paper numbered 154, and 220 treatments were given them. The majority were chronic and relapsing intestinal amoebiasis. Some were " healthy " carriers. It was impossible to follow up the patients after discharge from hospital. Results must therefore be expressed in terms of the relative ratio of " probable cures " to certain failures of treatment and of the ratio of positive to negative stools after treatment.

The authors' summary and conclusions are :—

(1) Alcresta ipecac gave ratio of probable cures to failures of 1 : 1·3 ; and of positive to negative of 1 : 7.

(2) Emetine injections (alone) gave corresponding ratios of 1 : 1·7 and of 1 : 7.

(3) Emetine injections plus " Panama bismuth " gave ratios of 1 : 1·8 and 1 : 8·7.

The addition of large doses of bismuth appears—clinically at least—to improve the chances of eradication.

(4) Emetine bismuth iodide (chiefly administered to carriers) gave ratios of 1 : 3·5 and 1 : 6·5 (Possibly it was not given in sufficient doses or for a sufficiently long preiod).

(5) Yatren given orally gave ratios of 1 : 1·3 and 1: 8. Results did not appear better (a few cases), when yatren *per os* was combined with yatren *per rectum*.

(6) Stovarsol appears to be of definite value in the treatment of chronic intestinal amoebiasis. The ratios were 1 : 1·1 and 1 : 13·6. It is of value also for its haematinic effects.

H. M. H.

Broden (A.). La thérapeutique de l'amibiase intestinale. [**Treatment of Intestinal Amoebiasis.**]—*Ann. Soc. Belge de Méd. Trop.* 1928. June. Vol. 8. No. 1. pp. 81–99. [6 refs.] [School of Trop. Med., Brussels.]

The subject matter is dealt with very fully ; illustrative clinical cases are described and discussed. In the treatment of *E. histolytica* infections, the author declares emetine to be still indispensable for hepatic amoebiasis and for amoebic invasion of other organs ; it is sometimes beneficial too at the onset of an acute case of amoebic dysentery, but even in these cure can be achieved only by yatren.

Yatren, in his experience, by the mouth alone, or by rectal lavage, or by both, according to case—in one or more courses of treatment—is the best therapy for amoebic dysentery and especially so for the more chronic cases. The era of emetine has been succeeded by the era of yatren ; though yatren will have its failures. In his experience yatren has had but little effect on the intestinal flagellates, Trichomonas and Chilomastix.

H. M. H.

Pappalardo (Concetto). Sulla terapia yatrenica dell' amebiasi. [**Amoebiasis treated by Yatren.**]—*Policlinico.* Sez. Prat. 1928. Aug. 6. Vol. 35. No. 31. pp. 1492–1499. [29 refs.] [Med. Clinic, Univ., Catania.]

Eight cases of infection with *E. histolytica* are noted, in three of which Giardia was also present. Treatment by yatren was given with excellent effect in all but one.

Three other cases are recorded, with Giardial infection only. In two of these yatren was ineffectual ; in the third the parasites disappeared after duodenal lavage with 200 cc. of a 1 1·5 per cent. solution.

H. Harold Scott.

de Mello (Froilano). Impressões clínicas sôbre o tratamento da disenteria amebiana pelo yatren purissimum. [**Cases of Amoebic Dysentery treated by Yatren Purissimum.**]—*Bol. Ger. Med. e. Farmacia.* Bastora. 1928. Jan. & Feb. Ser. 12. No. 1 & 2. pp. 5–7.

Three cases were so treated with apparent success.

H. Harold Scott.

Liu (King-Ban). **The Comparative Lethal Effects of Certain Chemicals on Bacteria and Cysts of** *Endamoeba histolytica* **from Human Feces.**—*China Med. Jl.* 1928. Aug. Vol. 42. No. 8. pp. 568–574. [4 refs.]

A preliminary report on tests of the comparative lethal effects of certain chemicals on bacteria and cysts of *E. histolytica* in human faeces with a view to obtaining a bacteria-free culture of the amoeba. Resistance of cysts of *E. histolytica* to the chemicals tested, as determined by the culture method, was found to be different from that reported by earlier workers employing the iodine eosin staining technique. Dilutions of the chemicals recommended by those investigators for killing the cysts are much stronger than the minimal lethal solutions as determined by the author using the culture method, and the time is also somewhat longer.

1. Five-tenths per cent. chlorinated water will not kill all the bacteria, but it will kill the cysts of *E. histolytica* within 36–48 hours, while one per cent. is amoebicidal without being bactericidal in 12–24 hours.

2. Potassium permanganate, in 1 : 500 dilution, will kill the cysts in 24–48 hours, but not under 24 hours. This is about the strongest solution that can be employed for attempting to make an amoebic culture free from bacteria, without devitalizing the cysts, but not all of the bacteria are killed in the dilution within this time limit.

3. In 1 : 1,000 dilution, mercuric chloride kills cysts as readily as bacteria.

The author notes that individual bacteria can be killed by these chemicals in the stated dilutions; but the difficulty lies in finding a practicable method for killing them *en masse* within a short period of time. Possibly attempts to reduce bacteria in the specimen to a minimal number through some physical means, e.g., temperature shocks, washing, centrifuging, etc., before subjecting them to any chemical, will ultimately prove effective in providing a bacteria-free culture of *E. histolytica*.

H. M. H.

Miller (M. W.). **Difficulty in Cultivation of** *Endamoeba histolytica.* —*Proc. Soc. Experim. Biol. & Med.* 1928. June. Vol. 25. No. 9. pp. 762–763. [2 refs.] [School of Med., Tulane Univ., New Orleans.]

Recounts briefly the author's failure to cultivate entamoebae by the method of Boeck and Drbohlav for more than one day, and that much only in 3 cases, from 19 patients with proved *E. histolytica* infection. However, he ends by recording possession of an undoubted culture of *E. histolytica*, through 4 successive subcultures, on Dobell's modification of Boeck and Drbohlav's mediums. [Dobell & Laidlaw, this *Bulletin*, Vol. 24, p. 363.]

H. M. H.

Craig (Charles F.). **Observations upon Complement Fixation in Infections with** *Endamoeba histolytica.*—*Proc. Nat. Acad. Sci.* 1928. July. Vol. 14. No. 7. pp. 520–526. [11 refs.] [Army Med. School, Washington, D.C.]

Boeck and Drbohlav's (1925) success in cultivating *E. histolytica* rendered possible the author's demonstration in 1927 [this *Bulletin*,

Vol. 25, p. 228] of haemolytic and cytolytic substances in alcoholic extracts of the parasite. The haemolysin dissolved r.b.c's of man, rabbit, and guineapig. The cytolysin dissolved intestinal epithelial cells of mucous membrane of man and cat. Bacteriolytic substances could not be demonstrated. Of practical importance is the author's finding that these alcoholic extracts could be used as antigens in a complement fixation test for the diagnosis of *histolytica* infections. In this paper the results of this test in 305 individuals are given. The author concludes that :—

" (1) There occur in the blood serum of individuals infected with *E. histolytica* specific immune substances which can be demonstrated by complement fixation when alcoholic extracts of cultures of this parasite are employed as antigens.

" (2) These complement fixing bodies disappear from the blood serum after treatment resulting in the disappearance of *E. histolytica* from the faeces of the individual.

" (3) Individuals free from infection with *E. histolytica* do not give a positive complement fixation reaction with the alcoholic extracts of cultures of *E. histolytica,* nor do those infested with *E. coli, E. nana, Iodamoeba williamsi, Chilomastix mesnili, Trichomonas hominis,* or *Giardia intestinalis.*

" (4) The reaction does not occur in individuals suffering from other infestations or diseases.

" (5) The reaction does not occur in individuals giving a positive Wassermann or Kahn test unless infection with *E. histolytica* is present.

" (6) Positive complement fixation reactions occur with these antigens in individuals suffering from symptoms of infection with *E. histolytica* and also in those in whom symptoms are absent, i.e., in the so-called ' healthy carrier ' of the parasite."

H. M. H.

Kessel (John F.). **Amoebiasis in Kittens infected with Amoebae from Acute and " Carrier " Human Cases and with the Tetranucleate Amoebae of the Monkey and of the Pig.**—*Amer. Jl. Hyg.* 1928. May. Vol. 8. No. 3. pp. 311–355. With 18 figs. on 6 plates. [17 refs.] [Peking Union Med. College, Peking.]

A full report of an important, and interesting, investigation. It is best described in the author's own summary and conclusions :—

" (1) Kittens have been experimentally infected both by mouth and by rectum with dysentery amoebae of man procured from ' carrier ' cases which have given no history of dysentery. The kittens thus infected have developed the same dysenteric symptoms and exhibited the same pathology as kittens infected with amoebae from amoebic dysentery cases.

" (2) Amoebae from races which produce both large and small cysts, respectively, have been used and both produce the same pathological conditions in kittens. From this evidence one may conclude that :

(*a*) The resistance of the host is a more important factor in the production of clinical amoebiasis than differences in the virulence of the parasites ;

(*b*) No evidence is produced for the conclusion of Brumpt (1926) that two species of amoebae, morphologically identical, exist, the one being pathogenic and the other non-pathogenic.

" (3) Three kittens, naturally infected with a dysentery amoeba, have been purchased from the streets of Peking. This amoeba is morphologically similar to the dysentery amoeba of man and produces the same symptoms and lesions in kittens.

" (4) Kittens have been infected with the dysentery amoeba of monkeys belonging to the genus Macacus and have developed dysentery and exhibited similar pathological findings at autopsy to those exhibited by kittens infected with the dysentery amoeba of man.

" (5) Kittens have been infected with the amoeba of the domestic pig which is morphologically similar to the dysentery amoeba of man and have developed the same pathological symptoms as those shown by other kittens with amoebic infection.

" (6) Kittens have also been infected with the dysentery amoeba of man and of the monkey respectively, which have been experimentally established in the pig and then recovered in culture.

From the point of view of the pathological changes produced in kittens one may conclude that the dysentery amoeba of man, of naturally infected kittens, of the monkey and of the domestic pig are in all probability one and the same species.

" (7) Amoebic infections have been established in kittens by infecting them with cysts of amoebae *per os* and *per anum* with and without the use of the celloidin plug. Fifty per cent. of positive infections were obtained when the cysts were given by mouth, without the use of the rectal plug, and 47 per cent. of positive infections were obtained with cysts by mouth and by rectum when the rectal plug was used.

" (8) Fifty per cent. of positive infections in kittens has been obtained when trophozoites from culture *in vitro* have been given *per rectum* without the use of the celloidin plug."

H. M. H.

Greenway (Daniel). Protozoofagia en la *Entamoeba histolytica*. [**Protozoophagy by** *Entamoeba histolytica*.]—*Arch. Argent. de Enferm. del Aparato Digest. y Nutric.* 1928. Vol. 3. No. 6. pp. 813–816. With 2 text figs. and 5 figs. on 3 plates. [1 ref.]

Mention is made of a patient infected by *Entamoeba histolytica* and *Giardia intestinalis* in whose faeces the author found some of the former (which he depicts) to contain unmistakeable remnants of the latter, both vegetative and cystic forms.

H. Harold Scott.

Bacillary Dysentery.

Mendoza-Guazon (M. Paz). **Some Notes on Bacillary Dysentery.**—*Jl. Philippine Islands Med. Assoc.* 1928. June. Vol. 8. No. 6. pp. 277–287. [34 refs.] [College of Med., Univ. of the Philippines.]

A thorough review of the subject. The literature dealing with Philippine bacillary dysentery records that Shiga, Flexner and Morgan No. 1, bacilli are causative agents. It causes great mortality among children and epidemics are more frequent in the rainy season. Examination of dysenteric stools has been of help in diagnosis of early and chronic cases (Haughwout). Dysentery carriers have been detected among food handlers. Serum treatment has been unsuccessful in the hands of pediatricians of the Philippine General Hospital, but has been advocated by other physicians. There is a close incidence relationship between dysentery and enteritis. Oedema in the early part of the disease is of good prognosis while in the protracted cases it is of bad omen.

The author's study of a series of cases shows that the total mortality from dysentery for the last two decades in the city of Manila is higher than that from cholera. More infants and males die of dysentery

than do adults and females. No focal necrosis is found in the lymph follicles and liver, but there is degeneration, proportional to the severity of the disease and the length of time of sickness. Presence of polymorphonuclears and macrophages supports findings of ONOMURA that the bacilli are killed by phagocytosis and agglutination. These cells are not found in the healing stage of the ulcers. Congestion and degeneration were the only changes noted in the kidneys; no nephritis was found in young patients, or in typical cases. The brain may show congestion, perivascular haemorrhages, and nerve degeneration.

Acute bacillary dysentery in the mother may produce abortion and sterility, and the children born may be stunted. Submucous cysts occur in which bacilli may lodge—explaining pathology of chronic carriers and relapses. Bronchopneumonia as a complication occurs more frequently in children than in adults. Appendicitis was found in three cases—in one the appendix was ruptured. There was one each of vaginitis, endocarditis, cholelithiasis, and perforation of intestine. Tuberculosis was noted in seventeen cases, and noma in six.

H. M. H.

CHARLES (J. A.). **Sporadic Dysentery in a Large City.**—*Lancet.* 1928. Sept. 22. pp. 616–619. [10 refs.]

The paper deals with 22 " sporadic " cases of dysentery occurring during the present year in Newcastle. The cases occurred in 15 separate domiciliary outbreaks. Five different organisms were discovered, viz.: (1) Three types of *Bact. dysenteriae,* Flexner, W, Z, and XY; (2) a Sonne bacillus; (3) a so-called para-Shiga organism. Wherever multiple infection occurred in a household, the type of causal organism was the same for all the cases therein. The author discusses these cases from an epidemiological standpoint and comes to no conclusion. Sufficient data for such are lacking. There was no definable factor common to all the cases, and there was nothing wherewith they could be connected together in a consecutive series. There was never any known contact between one affected family and another—either domestically, scholastically, or otherwise.

H. M. H.

KERRIN (John C.). **An Investigation of** *Bacillus dysenteriae* **(Sonne Type 3).**—*Jl. of Hyg.* 1928. Aug. Vol. 28. No. 1. pp. 4–8. [20 refs.] [Marischal College, Aberdeen.]

It is a common experience that organisms isolated from cases of bacillary dysentery do not give the characters of the classical types of *Bact. dysenteriae.* The Sonne organism is one of these divergent types. The illness caused by this organism is mild and the stools may contain no blood, but usually show mucus and pus. Colonies of this organism on MacConkey's bile salt neutral red agar are larger than those of *Bact. dysenteriae* (Flexner or Shiga), frequently show crenated edges, and are more delicate and translucent than those of the paracolon bacillus. Eleven strains have been isolated in routine examination. These organisms fermented glucose and mannite in 24 hours and lactose and saccharose after some days; they were non-motile, indol-negative and inagglutinable with polyvalent Flexner serum.

Bact. dysenteriae (Sonne Type III) is differentiated from the *Bact. dispar* group, a name given to the lactose fermenters of the dysentery group (ANDREWES 1918), by being indol negative and zylose negative. It is usually inagglutinable when freshly isolated, but will remove all agglutinins from a Sonne serum by absorption.

W. F. Harvey.

EVANS (W. Howel). **Fulminating Dysentery in a Child, caused by** *B. dysenteriae* **Sonne.**—*Brit. Med. Jl.* 1928. July 21. pp. 96–97. [10 refs.]

A previously healthy boy aged 10 died after 16 hours' illness which began suddenly with vomiting; and continued with severe frequent diarrhoea. Autopsy revealed nothing beyond intense congestion and catarrh of intestine. Cultures from large intestine and ileo-caecala lymph glands yielded abundant and pure growths of the Sonne bacillus.

H. M. H.

CALALB (G.). Recherches sur les bacilles dysentériques isolés en Roumanie. [**Dysentery Bacilli isolated in Roumania.**]—*Arch. Roumaines Path. Expérim. et Microbiol.* Paris. 1928. June. Vol. 1. No. 2. pp. 243–269. [61 refs.] [Serotherap Inst., Bucharest.]

The interest of this paper lies especially in the observations made upon the group denominated atypical dysentery bacilli and on the importance attached to serological and antigenic relationships for classification. The atypical bacilli studied were only those non-motile strains which did not ferment lactose. Such aberrant forms have been found towards the end of the disease or in stools which have been kept for several days, as may be the case with those sent to a laboratory by post. They were never met with in the 7 or 8 first days of a case of dysentery, nor were they to be found existing alongside Shiga or Flexner-Y bacilli. Anti-Shiga and anti-Flexner serums do not agglutinate these atypical forms, while they are lyso-resistant to a lytic agent which is active for Shiga and Flexner bacilli. Animals immunized with any of these atypical strains furnished sera, sometimes agglutinating true Flexner bacilli and sometimes both Flexner and Shiga bacilli. This is equivalent to saying that their antigenic power is identical with that of the true dysentery bacilli. The atypical bacilli themselves were normally agglutinated only by their own specific sera and not by the sera of animals immunized with true dysentery bacilli. And yet these serological characters could be completely altered by a sojourn of 48 to 72 hours in the body of the rabbit. They became then strongly agglutinable by either Shiga or Flexner sera. Now as true dysentery bacilli can lose their serological and bio-chemical characters with age or cultivation, it seems difficult to avoid the conclusion that the atypical dysentery organisms of the stools and true dysentery organisms have a common origin and that the former are phylogenetically derived from the latter. A natural classification of these variable organisms should accord preference to antigenic characters as more stable than biochemical and even serological characters.

W. F. Harvey.

CASTELLANI (Aldo). **Further Observations on Metadysentery and the Metadysentery Bacilli, with Remarks on the Classification of Bacterial Dysenteries.**—*Jl. Trop. Med. & Hyg.* 1928. Aug. 1. Vol. 30. No. 15. pp. 185–194. [19 refs.]

The author elaborates further (see this *Bulletin*, Vol. 25, p. 230) his conceptions regarding the group of organisms denominated by him metadysentery, which are differentiated from the true or Shiga dysentery group and the paradysentery or Flexner group. This metadysentery group was originally described as consisting of bacilli which do not produce gas in any sugar, but either ferment lactose (acid only) and clot milk or clot milk without fermenting lactose or ferment lactose and clot milk. In practice it is advantageous to make a single group of the metadysentery bacilli, as the clotting of milk is not a sufficiently definite differential character. The tribe Ebertheae, as defined by CASTELLANI and CHALMERS, is discussed from the point of view of subtribes, genera and species. Keys and differential tables, which facilitate differentiation, are given.

Some organisms of the metadysentery group are non-pathogenic, others pathogenic and there are several clinical types of metadysentery.

W. F. Harvey.

SCHÖBL (Otto) & VILLAAMIL (Rita). **Note on Bacteriological Diagnosis of Bacillary Dysentery.**—*Philippine Jl. Sci.* 1928. Feb. Vol. 35. No. 2. pp. 133–149. With 7 text figs. [9 refs.]

Emphasis is laid on the need to make special selection from the stool of shreds of mucus and blood for bacteriological examination. The examination must be made as early as possible before the bacteriophage is able to render successful isolation impossible. The technique of isolation is, in sequence: inoculation of material on lactose methylene blue-eosin agar ; examination for motility ; microscopic agglutination reaction ; growth of isolated organism on lactose-glucose double sugar medium, mannite, maltose and saccharose. With this arrangement of procedure a preliminary report can sometimes be given to the physician in 8 to 10 hours. In the agglutination test a horse serum, polyvalent for both fermenters and non-fermenters of mannite, was used.

W. F. Harvey.

MENTON (J.). **Limitations of the Agglutination Reaction in the Diagnosis of Bacillary Dysentery.**—*Brit. Med. Jl.* 1928. July 21. pp. 97–98. [5 refs.]

The outbreak which formed the subject of investigation occurred in an institution in which dysentery had been endemic for years. There was then every possibility of there being several sources of infection and several types of bacillus. It involved 120 cases and the sera of 47 affected individuals were examined. Standard Flexner types, V, W, X, Y, and Z and the Dreyer technique were used. Altogether 19 cases reacted positively and 28 negatively in the testing. Ten cases which were negative at first examination were positive later. Very divergent opinions exist as to the value of agglutination tests in dysentery. In this epidemic it was found that one negative agglutination did not exclude acute bacillary dysentery. The tentative diagnosis of Flexner infection could be made on repeated agglutination tests

from a fair number of cases, but the conclusion is reached that agglutination alone is not a valuable means of distinguishing the type of Flexner bacillus concerned. Different types of Flexner bacillus were present in the epidemic and it was even found that there was lack of correspondence between agglutinins in some of the patients' serums and the type of bacillus recovered from the faeces. Other conclusions reached are that there is a lack of correlation between the day of disease and the appearance of agglutinins and that agglutinins, when present, may disappear within 6 weeks of recovery or persist for years.

W. F. Harvey.

Ionesco-Mihaiesti (C.), Combiesco (D.), Condrea (P.) & Calalb (G.). Recherches sur le titrage du sérum antidysentérique. [**Titration of Antidysenteric Serum.**]—*Arch. Roumaines Path. Expérim. et Microbiol.* Paris. 1928. June. Vol. 1. No. 2. pp. 179–241. [21 refs.] [Serolog. Inst., Bucharest.]

The first objects of this research were to determine the best animal to use for titration, the most uniform and constant type of toxin (fresh, stabilized, etc.) and the best mode of administration of the toxin or toxin-serum mixtures (intravenous, intraperitoneal, or subcutaneous). Numerous detailed descriptions are given of the experiments made to clear up these points. Standard toxin and standard antitoxin were obtained from the Copenhagen Institute. By definition the *neutralizing dose* of a standard serum is the quantity which, when mixed with 10 lethal doses of standard toxin for mice, prevents the death of more than two-thirds of the animals inoculated. The *non-neutralizing dose* is that which, when mixed with the same quantity of standard toxin does not prevent the death of at least two-thirds of the animals inoculated. Preliminary titrations have shown that, for standard serum, 1–200th cc. of the solution, glycerinated at 1 per cent. contained the neutralizing dose for mice and this has been adopted as the antidysenteric antitoxic unit. The following conclusions are drawn :—

(1) The rabbit is much more sensitive to dysentery toxin than the mouse, and shows much greater variation among individuals. (2) The most constant results, both in rabbits and mice, are obtained by intravenous inoculation. (3) Although intravenous inoculation of the mouse is a rather delicate operation, it is not really difficult. (4) Liquid toxins possess certain advantages over the toxin represented by dried microbial bodies, owing to absence of agglutination in the former. Nevertheless, as no permanent stabilization of the liquid toxin is observed—and in this respect dysentery toxin differs from diphtheria toxin—the authors propose to use dried microbial bodies for the titration of Shiga antiserum. (5) The existence of a neurotoxin as distinct from an intestinal toxin was not demonstrated for the Shiga bacillus, either by heating or by filtration through a collodion membrane.

W. F. Harvey.

de Assis (A.) & Mendes (N. O.). Sobre as immunagglutininas dysentericas de cavallo e seu valor pratico. [**The Use in Practice of Agglutinating Dysentery Sera from the Horse.**]—*Sciencia Med.* 1928. July. Vol. 6. No. 7. pp. 323–332. [7 refs.] [French summary pp. 332–333.

Prolonged immunization of the horse with different strains of Shiga bacilli results in the production of a serum which will agglutinate Shiga

bacilli and also the bacilli of the Flexner-Hiss group. No difference was detected between Flexner or Hiss organisms recently isolated and those which had been cultivated. A strain of Hiss recently isolated from man was used to immunize a horse. The serum obtained agglutinated strongly, and equally well, all the paradysentery bacilli of Hiss or Flexner type. The authors prefer the horse to the rabbit for the production of agglutinating sera. In practice an organism agglutinating with a Shiga horse serum only was regarded as a Shiga strain and an organism agglutinating with both Shiga and Hiss sera was set down as a paradysentery or Flexner-Hiss bacillus. Subsequent passage of the organism through mannite medium always confirmed the previous diagnosis.

W. F. Harvey.

de Assis (A.). Ueber die Natur der Giftigkeit der mannitvergärenden Dysenteriebazillen. [**The Nature of the Toxicity of the Mannite Fermenting Dysentery Bacilli.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. Vol. 58. No. 3–4. pp. 343–353. [5 refs.] [Vital Brazil Inst., Niteroi, Brazil.]

A strain of the Y-Hiss type was used. It had been recently isolated from a human case and was moderately toxic for mice and rabbits. Four preparations were experimented with: (1) Old bouillon culture filtrate, (2) the filtrate of a culture autolysed in distilled water, (3) dried bacterial deposit obtained by centrifuging a distilled water suspension of killed bacilli, and (4) wash water toxin, which is the supernatant fluid obtained by centrifuging a distilled water suspension of bacteria, drying, redissolving and recentrifuging it to clear off all undissolved matter. The first two preparations were not toxic, while the other two were toxic for mice by intravenous injection. Antitoxin formation to these antigens could not be demonstrated, even with prolonged immunization of horses. The conclusion is drawn that the toxicity of the Y-bacillus is bound up with the bacterial protoplasm and is not due to a toxin.

W. F. Harvey.

Przesmycki (F.), Lipowska (L.) & Sierakowski (S.). Ultrafiltration des toxines dysentériques. [**Ultrafiltration of Dysentery Toxins.**] —*C.R. Soc. Biol.* 1928. Oct. 19. Vol. 99. No. 28. pp. 1159–1160. [State Hyg. Inst., Warsaw.]

Shiga-Kruse toxin was obtained from a bouillon (pH 7·6) culture of 14 days, which was carbolized at 0·5 per cent. and centrifuged to give clear supernatant fluid. This fluid killed a 1,500-gm. rabbit, in a dose of 0·075 cc. The filtrate of the toxin through 1, 2 and 4 per cent. collodion membranes had lethal doses of 0·1, 0·1 and 0·15 cc. respectively, while the filtrate through 7·5 per cent. collodion gave rise to no symptoms even in doses of 1 to 2 cc.

A close parallelism in regard to the amount of toxin passing the ultrafilter exists between dysentery toxin and diphtheria toxin. If dysentery toxin were separable into endo- and exo-toxin, of which the former gives rise to intestinal symptoms and the other to nervous symptoms, it should be possible to retain the endotoxin along with albumins by means of 4 per cent. collodion filters and obtain only

exotoxin in the filtrate. But the authors found that rabbits injected with filtrates of 4 per cent. filters showed intestinal symptoms and *post mortem* lesions of the large intestine.

W. F. Harvey.

Salvioli (G.). Tentativi di vaccino-terapia orale nella dissenteria bacillare. [**Oral Vaccino-Therapy in Bacillary Dysentery.**]—*Pediatria.* 1928. Aug. 1. Vol. 36. No. 15. pp. 802–806. [12 refs.] [Inst. Clin. Pediat., Univ., Padua.]

The vaccine was used in children and contained 8,000 million detoxicated Shiga, 8,000 million Flexner and 8,000 million Strong-Y bacilli per cc. It was given twice daily without any preliminary administration of bile. Six cases treated with serum were cured in an average period of 9 days, where the treatment was begun from the 3rd to the 6th day of disease. Six cases treated with vaccine were cured in 12 days after administration of, on an average, 10·5 cc. of vaccine. The treatment commenced from the 3rd to the 9th day of disease. The author concludes that a polyvalent dysentery vaccine given by the mouth is not a substitute for serum treatment. It requires a longer time to effect a cure.

W. F. Harvey.

Blanc (Georges) & Caminopetros (J.). Contribution à l'étude expérimentale de la vaccination antidysentérique appliquée à l'homme par voie buccale et par voie sous-cutanée; la vaccination par bacilles vivants. [**Oral and Subcutaneous Vaccination against Dysentery by Living Bacilli.**]—*Rev. d' Hyg. et de Méd. Préventive.* 1928. May. Vol. 50. No. 5. pp. 321–360. [64 refs.] [Pasteur Inst., Athens.]

A somewhat detailed survey is given of the experimental work done on immunization by means of killed or living dysentery bacilli with and without bile, formolized vaccine, and of dysentery toxin, first as applied to animals and then to man. The experimental work of the authors is separable into trials of oral vaccination, and vaccination by subcutaneous injection of killed dysentery bacilli and of living bacilli. In the first place a well controlled trial of the possibility of absorption of dysentery toxin with oral administration was made upon one of the authors themselves. The result left no doubt of that possibility, as the resulting syndrome was definitely dysenteric. Against this definite result there had to be set complete failure in the case of other volunteers. The explanation seems to have been that if intestinal lesions already exist, such as would be the case in bacillary dysentery itself, or as in this case, in intestinal catarrh, absorption will then take place. For oral vaccination experiments in the case of the Shiga bacillus, toxin was used in one set of trials and killed cultures in another. The test applied to the volunteers was ingestion of young 24-hr. cultures of virulent organisms. The result for oral toxin immunization was that 4 persons out of six succumbed, just as the controls, to dysentery with organisms in the stools. For oral immunization with killed bacilli the result was 4 cases of dysentery out of 7. Flexner experiments followed the same lines. The serum of the

vaccinated individuals possessed no antitoxic power and the general conclusion is drawn that oral vaccination, under the conditions of immunization and test, gave no immunity. There follow the trials with killed and living organisms subcutaneously for both Shiga and Flexner bacilli. The secret of obtaining non-toxic vaccines from toxic organisms is to sow on dry media, to remove the comparatively dry growth after 24 hrs., and to use the vaccine quickly before autolysis can take place. It is the toxin of dysentery bacilli and not the intact bodies of the organisms which set up a violent reaction (see this *Bulletin*, Vol. 24, p. 802, Blanc & Caminopetros). With killed organisms 5 Shiga cases out of 8 succumbed to test and 2 Flexner out of two. With living organisms subcutaneously none contracted Shiga dysentery out of 13 tested, as compared with 7 out of 7 controls, and in similar fashion none succumbed of 7 Flexner cases as against 3 out of 3 controls. An antitoxic power in the serum of the vaccinated was demonstrable for subcutaneous inoculation of living organisms but not for inoculation of killed organisms.

The general conclusion is that subcutaneous inoculation of living dysentery organisms is innocuous and efficacious in the production of immunity.

W. F. Harvey.

Mixed and Unclassed Dysentery.

Manson-Bahr (Philip). **The Sigmoidoscopic Appearances of Dysenteries of Tropical Origin.**—*Proc. Roy. Soc. Med.* 1928. Mar. Vol. 21. No. 5. pp. 898–903 (Sect. Surgery pp. 40–45). [2 refs.]

Dysenteric conditions in tropical practice are frequent; and it is difficult to determine, at present, their true nature, by laboratory investigations alone. An extension of clinical diagnostic methods which enhances the possibility of correct diagnosis preliminary to efficient treatment is therefore one of real importance. The author claims this for sigmoidoscopy. He has been the first to expound the characteristic macroscopic changes it reveals and their exact correlation with the morbid histological pathology of the various dysenteries; thus demonstrating the value of sigmoidoscopy, and its necessity, for the physician. Its growing use testifies to the real value of this contribution by the author to clinical medicine. In this paper he sets out fully, clearly, and convincingly, the distinctive sigmoidoscopic appearances of dysenteries of tropical origin, and shows that the increased accuracy and ease of diagnosis their recognition confers, and the correctness of treatment, forces sigmoidoscopy on the physician, for all bowel complaints. He emphasizes the necessity of a magnifying eye-piece if the minuter lesions are not to be missed.

Amoebic dysentery—a disease of the submucosa. In about 25 per cent. of cases the lesions are confined to caecum and ascending colon and do not extend to sigmoid and rectum. In the majority, however, the lesions, which are quite distinctive of amoebic infection, reach down to the internal sphincter and even the anal margin. General characteristics are—painlessness to direct examination; superficial lesions; laxity and redundancy of mucosa, which is normal in between the scattered and isolated ulcers. The ulcers are small in size—in contrast to the large punched out amoebic ulcers found in upper part of bowel at autopsy. Often a striking diagnostic feature

are the small submucosal petechial haemorrhages which may surround the actual ulcers, or be scattered haphazardly. Large haemorrhages often occur in the interstices or even in ragged cracks between the folds of mucosa.

Acute stage.—There may be considerable destruction of mucosa. Discrete lesions may coalesce to produce ragged bleeding granulations—resembling lesions of bacillary dysentery except that bowel surface is much folded. The condition in fact resembles the intense process set up in experimental amoebiasis of kittens.

Subacute stage.—Rugose and folded bowel surface. Minute yellow papular elevations—really submucosal abscess nests of amoebae—which, on breaking down form snail track ulcers, and later the diamond or lozenge shaped ulcers of the chronic stage.

Chronic stage.—Definite ulcerations 5 mm. or more in diameter, superficial, with ragged edges deep into submucosa ; usually undermined edges, haemorrhagic margins, and yellowish or grey bases.

Latent amoebic dysentery.—Yellow papules on the inner surface of the natural folds of the gut, e.g., on Houston's valves ; or the mucosa may be studded with very small shallow pits which represent healed ulcerations, often mingled with which are small haemorrhages.

Carriers or cyst passers.—Either small granulating patches, or small scattered petechial haemorrhages indicating site of minute amoebic lesions. It is thus clear that in these " cyst passers " there may exist lesions which may extend and give rise to ulcerations evoking active signs of amoebic dysentery.

For microscope.—Scrapings from bowel ulcers or papules, or from haemorrhagic spots, will often disclose amoebae or the characteristic Charcot-Leyden crystals, when many searches in stool samples had failed to reveal them.

After treatment.—Healed bowel shows no abnormality of colour, but many small pits where ulcers have healed.

Bacillary dysentery.—A disease of the mucous membrane in which the dysentery bacillus multiplies and eventually causes its necrosis. Infiltration and oedema of submucosa are secondary to changes in mucosa. Pathological changes in bowel wall are much more severe and extensive than are those of amoebic dysentery.

Acute stage.—In the very acute early stage sigmoidoscopy is hardly justifiable. The mucosa resembles that seen at autopsy. The surface is slightly nodular, rose pink or plush red and oedematous, numerous red blotches caused by submucous haemorrhages ; the walls of gut are rigid and inelastic, the natural folds are absent. Mucosa bleeds readily on touch, and the examination gives pain ; lumen of gut is filled with bright red bloody mucus.

Subacute stage.—Granulations in irregular patches, and plaques where necrotic mucosa has desquamated or been removed. The granulations are painful and bleed easily.

Chronic stage.—Mucosa has been converted into a solid layer of granular tissue. (This is the " idiopathic ulcerative colitis " of the text books and, none other, so the author contends, than the sequel of dysentery bacillus infection of the bowel).

The bowel is a rigid indurated inelastic raw bleeding tube with natural folds absent. Examination is extremely painful and the rough granular surface bleeds readily on touch. Exuberant granulations may be polypoid ; sometimes fibrosis of bowel wall may result in partial stricture or in fibrotic scarring of surface. Help in diagnosis is given by patulous anus, and atrophic appearance of skin around it ; and by wasting of gluteal and perineal muscles.

Intestinal schistosomiasis.—Sigmoidoscopy in the two cases studied, revealed irregular patches of granulation tissue dispersed through mucous membrane of upper rectum and around recto-sigmoidal junction. Granulations slightly raised and capped with yellow adherent lymph. In scrapings of this granulation tissue microscopic examination discovered the lateral-spined ova.

Sprue.—" One of the mysteries of tropical medicine ; its aetiology is still unknown and its correct investigation is one of the burning questions of the day." One early case (the only case so far recorded from Nyasaland) disclosed through sigmoidoscope a ridged and folded mucous membrane, finely granular on surface ; cherry pink to scarlet in colour. Viscid adherent mucus ; liquid peculiarly white faeces. In advanced stages, with atrophy of mucous membrane, the latter is lax, pale yellow almost diaphanous ; so that great care is needed lest the attentuated and friable bowel wall be torn.

Tuberculosis of large bowel.—The author points out is not an infrequent sequel of bacillary dysentery. It appears as acute " ulcerative colitis." The patients are extremely ill and emaciated. The mucous membrane is greatly indurated hyperaemic and sensitive ; plush colour and bleeds readily to touch. The tubercle bacillus may be demonstrated in scrapings, or more usually in the bloody mucous exudate after digesting the whole stool with antiformin and centrifuging.

H. M. H.

KHALID (Zaky). **Micro-Organisms of Diarrhoea and Dysentery of Children in Egypt.**—*Jl. Egyptian Med. Assoc.* 1928. June. Vol. 11. No. 6. pp. 195–207. With 2 text figs.

During four summers the author has examined in children (18 hours to 6 years old) 476 cases of diarrhoea, and 150 control cases, i.e., children not suffering at time of examination from any bowel symptoms.

	Diarrhoea cases.	Control cases.
Microscopically :	Per cent.	Per cent.
Trichomonas	4	1·5
Lamblia	3	0
Oxyuris	9	5·0
Ascaris	2	1·5
Negative	82	97·0
By culture :		
B. carolinus	30	4
B. Morgan No. 1	12	2
B. pyocyaneus	5	0
B. Gaertner	7	0
B. fecalis alcaligenes	4	3
B. proteus	5	2
B. coli communis et communior ...	37	89

Two (*Macacus sinicus*) monkeys fed with massive doses of B. carolinus developed fever, emaciation, and continued loose stools, and died on the 16th and 18th day respectively. Autopsy revealed marked congestion of large intestine, especially sigmoid and caecum.

Dysentery—142 cases were examined and revealed :—

Dysentery bacillus Shiga	19 cases.
Dysentery bacillus Flexner and Y	76 „
B. Morgan No. 1	20 „
B. pyocyaneus	4 „
E. histolytica	10 „
B. paratyphosus A or B	4 „
B. asiaticus	3 „
Negative	6 „

The distinction between diarrhoea and dysentery was clinical.

H. M. H.

Phelps (Earle B.) & Dávila (Jorge Victor). **Diarrhea and Enteritis in Porto Rico. II. Relation to Water Supplies.**—*Porto Rico Rev. of Public Health & Trop. Med.* 1928. May. Vol. 3. No. 11. pp. 468–487. With 4 charts. [3 refs.]

The authors conclude from the statistical evidence, here set out, analysed and discussed, that diarrhoea and enteritis under one year of age, as reported in Porto Rico, is probably of different origin and possibly therefore of somewhat different type from the disease of the same name as reported in the higher age groups ; and that in all probability the disease reported in those age groups over one year is to a large extent water-borne. Such conclusions are necessarily tentative until further tested by appropriate bacteriological or other aetiological studies, or until confirmed by further studies of improvement following the installation of satisfactory water purification in the cities.

H. M. H.

Hoshizaki (Soyo). **The Clinical and Bacteriological Examination of Dysentery in Dairen, South Manchuria.**—*Jl. Oriental Med.* 1928. July. Vol. 9. No. 1. English summary pp. 14–16. [In Japanese.]

1,220 cases have been treated in the isolation hospital in the past 10 years, 1,114 Japanese, 106 Chinese. The mortality of Chinese was three times higher than that of Japanese. Ratio of bacillary to amoebic dysentery was 34 : 1. Bacillary dysentery mortality 54·9 per cent. ; including ekiri, 44·6 per cent. ; amoebic dysentery, 17·2 per cent. Ages of greatest frequency were 1 to 5 years, in children ; 20 to 30 years in adults. Months of greatest frequency are July, August, September. Dysentery bacilli strains isolated were—Shiga, original type, 39·3 per cent. ; Y. Hiss-Russell, 46·1 per cent. ; Flexner, 5·6 per cent. ; Strong, 5·6 per cent. ; Mannite non-fermenter, serologically not Shiga, 3·5 per cent. In convalescence serum agglutinated Shiga type bacillus—160 cases ; Y type 180 cases ; Flexner type 260 cases. Most of the Shiga strains were isolated from children in middle of epidemic. In the 1927 epidemic toxic symptoms were least marked in Shiga infections, and Shiga case mortality was 24·4 per cent. as against the others' 39·4 per cent. Of 371 cases of dysentery 19 were family infections.

H. M. H.

Mattos (Amaral). Sobre alguns casos de dysenterias parasitarias em lactentes. [**Parasitic Dysentery among Infants.**]—*Sciencia Med.* 1928. Apr. Vol. 6. No. 4. pp. 184–191. [1 ref.]

A statement handed down and generally believed is that amoebic dysentery is almost unknown up to the age of six months. The author gives accounts of three cases, aged 5 months, 40 days, and 6 months respectively, in which he found amoebae and which cleared up on proper treatment after various non-specific measures had failed. He notes that in parts of Brazil the infantile mortality is high particularly from intestinal affections. The causes assigned are congenital debility, gastro-enteritis, athrepsia, etc., but it is probable that many of these cases are amoebic, since amongst 25 children recently under the author's care five had amoebic dysentery.

H. Harold Scott.

Mitsuhashi (Chiaki). [**Epidemiology of Dysentery in the Dormitory of the Higher Women's Normal School.**]—*Nihon Densembyogakkwai Zasshi (Jl. Japan. Soc. of Infectious Dis.).* 1927. Oct. Vol. 2. No. 1. [Summarized in *Japan Med. World.* 1928. May. 15. Vol. 8. No. 5. p. 129.]

Thirty-six cases occurring "explosively." In all symptoms were very slight; had the cases occurred sporadically they would have been treated as non-dysenteric. Bacteriological investigation revealed Kawase strain of dysentery bacilli.

H. M. H.

de Langen (C. D.). **Flagellata Diarrhoea and Diet.**—*Acta Leidensia (Scholae Med. Tropicae).* 1927. Vol. 2. pp. 137–142.

Five flagellate protozoa occur in the human intestinal canal—viz., *Giardia lamblia, Trichomonas hominis, Chilomastix mesnili, Embadomonas intestinalis,* and *Enteromonas hominis.* The first three are the most frequent. Flagellate diarrhoea is often heard of. It has one symptom only—frequency of stools, in which numerous flagellates are found. During recovery the flagellates disappear partially or entirely from the stools though remaining cysts of lamblia can still be found. Cysts of trichomonas have not yet been discovered. It has not been proved that the flagellata cause the diarrhoea. It may be only that altered intestinal conditions have enabled intense multiplication of the parasites. In fact, large numbers of flagellates are often found in unhealthy intestinal conditions when the aetiology of the unhealthy intestinal condition is quite clear; and when recovery takes place the flagellata disappear.

Thus, in clinical practice little notice is taken of these flagellates. If in large numbers, they are got rid of fairly successfully by means of yatren and stovarsol, and sometimes it is noted that with their disappearance goes too the intestinal affection complained of.

Hegner found that trichomonas and lamblia disappeared from the intestinal canal of their animal hosts when these were fed on a meat diet. The author has investigated the effect of meat diet on nine human patients with frequent diarrhoea and numerous lamblia or trichomonas in the stools. Those reacted best on the meat diet who had very large numbers of flagellates in the stools and faulty carbohydrate digestion: some, however, with no faulty carbohydrate digestion reacted well to

the meat diet (disappearance of flagellates and diarrhoea). The author pleads for further careful investigation of the occurrence of flagellates in connexion with various diets of man.

H. M. H.

ZAHORSKY (John). **Giardiasis in Children.**—*Southern Med. Jl.* 1928. Aug. Vol. 21. No. 8. pp. 595–597. [8 refs.]

MILLER 1926 [this *Bulletin*, Vol. 23, p. 679] has drawn attention to this parasitism in children and states that, in his opinion, it produces chronic enteritis, often severe enough to retard growth. The author from his studies concludes that the cardinal symptom is continuing tendency to looseness of bowels, without as a rule marked diarrhoea. There is merely heightened peristalsis and increased fermentation of intestinal contents. Stools contain increased amount of fat and undigested particles. General nutrition is poor. There is no eosinophilia and no definite blood changes.

Giardia intestinalis is frequently found in the faeces of children and infants. In older children its presence is not always accompanied by digestive or nutritional disturbance. In infants, however, infestation produces increased intestinal peristalsis, lessening of food absorption, and consequent retardation in growth.

Administration of bismuth salicylate several times a day for a week, repeated several times during six months or more, is effective in improving the clinical condition and may remove the parasite permanently.

H. M. H.

CORT (E. C.). **Infection with *Balantidium coli*. Twelve Cases treated with Oil of Chenopodium.**—*Jl. Amer. Med. Assoc.* 1928. May 5. Vol. 90. No. 18. pp. 1430–1431. [2 refs.] [McCormick Hosp., Chiengmai, Siam.]

The author states that in 8,000 stool examinations in Chiengmai, Siam, *Balantidium coli* was found 14 times. Twelve of these occurred in three months in 1925. One patient had practically no symptoms ; the others had suffered from haemorrhage from the rectum or from diarrhoea. AGUILAR [this *Bulletin*, Vol. 24, p. 30] reported forty cases of *Balantidium coli* successfully treated with acetarsone (stovarsol). Two of the author's patients showed Balantidium in the stool after treatment with 0·25 gram of acetarsone twice daily for seven days. Following the suggestion of Dr. C. W. MASON [this *Bulletin*, vol. 14, p. 337] oil of chenopodium was then tried and proved successful. Twelve cases were, in fact, treated by enema of 15 cc. of oil of chenopodium in 150 cc. of olive oil. In one only was there any untoward effect. This patient received, by mistake, a second treatment in 24 hours. He developed profuse vomiting, dizziness, collapse. Recovery in a few hours followed on repeated enemas—and hypodermic infusion —of physiological sodium chloride solution, stimulation, and gastric lavage. He was left with deafness which disappeared only after many months. All the patients remained free of *Balantidium coli*, as shown by repeated stool examination 9 to 28 months afterwards.

H. M. H.

DE ASSIS (A.). Sobre alguns aspectos práticos das dysenterias no homem.—*Arch. Brasileiros de Med.* 1928. July. Vol. 18. No. 7. pp. 652–672.

BROWN (Philip W.). A Clinical Consideration of Endamebiasis.—*U.S. Veterans' Bureau Med. Bull.* 1928. Sept. Vol. 4. No. 9. pp. 752–755.

IZQUIERDO SALAZAR (Alfredo). El Yatren 105 en la disenteria amibiana. [Thesis.]—38 pp. [17 refs.] Republica de Colombia. Facultad de Medicina y Ciencias Naturales. 1927. Bogota. Tip. Voto Nacional.—Calle 10, 332.

MELNOTTE (P.). Contribution à l'étude de la pathologie intestinale au Maroc.—*Bull. Soc. Path. Exot.* 1928. June 13. Vol. 21. No. 6. pp. 440–452. [Auvert Hosp., Fez, Morocco.]

RAÚL GOYENA (Juan). Sobre la necesidad de emprender la campaña profiláctica contra la amebiasis.—*Semana Méd.* 1928. May 31. Vol. 35. No. 22 (1794). pp. 1330–1331. [3 refs.]

TAKEDA (Shunichiro). Blood Findings of Types of Bacilli of Dysentery.—*Oriental Jl. Dis. Infants.* 1928. July. Vol. 4. No. 1. English summary p. 5. [In Japanese.] [Pediat. Clinic, Imperial Univ., Kyoto.]

TRABAUD. Abcès du poumon d'origine indéterminée guéri par l'émétine.—*Rev. Méd. et Hyg. Trop.* 1928. Mar.–Apr. Vol. 20. No. 2. pp. 33–35.

REVIEWS AND NOTICES.

Ross (Ronald). [K.C.B., K.C.M.G., F.R.S., F.R.C.S., Colonel, T.A. (ret.), Major, I.M.S. (ret.), etc.] **Studies on Malaria.**—pp. xi+196. With 4 plates. 1928. London: John Murray, Albemarle Street, W. [5s.]

We learn from the cover that this book gives in a small compass all the essentials of the author's work on malaria from 1895 to the present time. After a short chapter on previous discoveries and speculations Sir Ronald describes in 15 pages his work in India between May, 1825, and February, 1899; the account though short gives an idea of the difficulties met with and the indifference of seniors and colleagues. Moreover, he "had to discover something of which he did not know either the site or the appearance in an animal of which he did not know even the species." The next 22 pages are devoted to the Italian claims, which Sir Ronald vigorously contests, and here it may be remarked that the critical vein runs through all the chapters. There follows the appointment to the staff of the Liverpool School of Tropical Medicine (at £250 per annum) and the first expedition to Freetown. An amusing account is given of a deputation to the Colonial Office in 1901 to discuss the "simple sanitary reforms" required in West Africa; it was not fruitful. This failure led to the second expedition to Freetown to show the Government and others how to reduce mosquitoes; it was to be an object lesson. On the same occasion Sir Ronald visited Lagos where Sir William MacGregor was Governor. Further chapters are concerned with the campaign at Ismailia and a visit to Panama. Illustrating the thesis that the most brilliant results of sanitary science are of a negative character the author writes: "Gorgas told me in 1904 that after he had cleared Havana of mosquitoes an American official said to him, 'I don't know why you make such a talk about mosquitoes and malaria: I have been here a week and have seen very little of either'." Accounts of visits to Greece, Mauritius, Ceylon and Cyprus follow. The book concludes with a summary of facts about malaria, reprinted from an earlier publication, and a list of 108 references. The book is written in an interesting manner and can be read through at a sitting; naturally, it will not replace for the serious student the longer works such as the Prevention of Malaria and the Memoirs.

A. G. B.

Sautet (Jacques). La lutte contre le paludisme en Corse. [**The Fight against Malaria in Corsica.**] Préface du Professeur Brumpt. Travail fait au Laboratoire de Parasitologie de la Faculté de Médecine de Paris et à la Station d'application antipaludique de Bastia (Corse) 1925–1928.—96 pp. With 2 maps, 3 charts & 2 figs. 1928. Masson et Cie., Editeurs, Libraires de l'Académie de Médecine, 120, Boulevard Saint-Germain, Paris, VIe. [Fr. 16.]

The International Health Board, in collaboration with the local authorities and Professor Brumpt, established a Station at Bastia for the study of the malaria of Corsica. In doing so they appreciated that the control of malaria is always, at least to some extent, a local problem. In this publication Dr. J. Sautet, who worked at Bastia during the summers of 1926 and 1927, presents some of the particular difficulties and successes. His introductory chapters deal with the history, geography, climate and economic state of Corsica. He then points out that the disease is almost unknown in the hills, that is to say in the greater part of the island, and that it is particularly troublesome in the plain which occupies the eastern side of Corsica; the epidemiology is complicated, as it is in so many parts of the Mediterranean, by the migratory habits of the peasants. About 70 per cent. of the parasites identified were *Plasmodium falciparum*: the proportion of quartan parasites (*P. malariae*) was in the neighbourhood of 20 per cent., an unusually high figure.

That section of the book which deals with Anopheles is perhaps the least complete. The author discusses the biology of the larvae and their relation to salinity and other factors, without stating the species to which his observations refer ; even if it proved impossible to rear the adults and so identify them, it should have been easy to recognise the larvae themselves, for only five species occur (exclusive of *A. plumbeus* which doubtless breeds only in holes in trees). Of the species which are known to occur, one would suppose that *A. maculipennis, elutus* and *bifurcatus,* might all be concerned in the spread of malaria, though the author is inclined to attach most of the blame to the first of these. In the chapter which deals with the control of larvae one notices that the small fish, Gambusia, are found valuable. The control of larvae is difficult, for most of the breeding-places are nearly at sea-level. The book concludes with a comparison between Corsica, Sardinia and Sicily, and suggestions for the improvement of the health of the Corsicans.

It will be seen that this study of malaria in Corsica is planned on broad lines, but there are several topics on which further information is wanted. In some of the earlier sections, the facts quoted bear little relation to the subject of the book ; one is informed that the rainfall is higher in the hills than the lowlands (the converse of this platitude would be more worth stating) ; but there are no facts about the local, or the seasonal distribution of the rain ; one looks in vain for information about differences in rainfall from year to year, though it is common knowledge that great variations occur in all Mediterranean lands, and that they have an important bearing on the incidence of malaria. And then again, in dealing with geology, Dr. Sautet says that there are 180,872 hectares of primary rocks, and Heaven only knows how many hectares of various other rocks ; but he does not tell us whether part of the island is limestone and part not, and if so whether this has any influence upon the distribution of Anopheles, as it probably has in other countries. Facts of this sort would be of great value, and it is disappointing that they are not given ; one could spare the references to hundreds of kilometres of main roads, the number of pigs in Corsica in 1910, the importation of potatoes, and the historical remarks about Phoceans, Consuls, Tuscans and other people long deceased.

P. A. Buxton.

NAUCK (Ernst G.). Epidemiologie und Tropenkrankheiten in China. [**Tropical Diseases in China.**]—*Beihefte z. Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Vol. 32. No. 5. pp. 201–277. [83 pp.] [15 pages of refs.]

This supplement is entirely devoted to an essay on the conditions of tropical diseases in China at the present day. The earlier investigations into diseases in China are part of the development of tropical medicine and Dr. Nauck mentions Sir Patrick MANSON as one of the greatest pioneers, giving a brief sketch of his work. After some introductory remarks on general conditions and future problems we come to sections on the various diseases. Eleven pages are devoted to the history of malaria and its manifestations with a short note on blackwater fever. The author gives a list of the anophelines found in China, Japan, Korea and Formosa and many of these are well known carriers of malarial infection. The first case of kala azar was, it is stated, observed by AIRD in Hankow in 1915 and the diagnosis was confirmed by Sir Patrick MANSON after examination of stained preparations and since then COCHRAN, YOUNG and others have shown that the disease exists in China. All the other well-known diseases found in tropical climates receive notice, together with parasitic diseases so common in China—filariasis, ankylostomiasis and schistosomiasis.

Dr. Nauck has founded his work on three years' personal observation in China and on a careful study of the literature of his subject. He does not produce anything new or original, but his essay is well written and makes quite interesting reading. The long list of classified references at the end of this work will be most useful.

J. H. Tull Walsh.

GIMLETTE (John D.) [M.R.C.S., L.R.C.P., etc.] **Malay Poisons and Charm Cures.** Third Edition.—pp. xiv+301. With 3 plates. 1929. London: J. & A. Churchill, 40, Gloucester Place, Portman Square. [10s. 6d.]

The last edition of this book (1923) was reviewed in Vol. 20 of the *Bulletin*. In the present edition, the preface states, fresh matter has been added and corrections made and the index has been enlarged. The first half is occupied with charms and spells, the rest with poisons, animal, vegetable and inorganic. A collection of the poisons to which reference is made has been placed in the Museum of the London School of Hygiene and Tropical Medicine. The index now contains the Latin names of the plants yielding the poisons, which was not so before. Apart from its interest to the anthropologist the book should be useful for reference.

A. G. B.